MERLIN Interrupter

User Manual

Version 2

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Table of contents

Introduction to the MERLIN Interrupter 3

Interrupt Modes - Patterned Interruption 4
Interrupt Modes - Constant Interruption 5

Controlling the MERLIN Interrupter with a Mobile Phone 6
- Start a Patterned Interruption 7
- Stop a Patterned Interruption 8
- Check Interruption Status 8
- Start a Constant Interruption 9
- Stop a Constant Interruption 10
- Check Interruption Status 10
- Checking the GPS Information of a MERLIN TR Monitor 11
- Troubleshooting SMS Messages 12

Controlling the MERLIN Interrupter via CPSM 13
- Start a Patterned Interruption: Pipeline 15
- Stop a Patterned Interruption: Pipeline 16
- Start a Patterned Interruption: Location 17
- Stop a Patterned Interruption: Location 18
- Start a Constant Interruption: Location 19
- Stop a Constant Interruption: Location 20
- Check Interrupt Status: Location 21
- Checking the GPS Information of a MERLIN TR Monitor 22
- SMS Message Store 23
- Troubleshooting CPSM 25

Controlling the MERLIN Interrupter via iCPSM 26
- Start a Patterned Interruption: Pipeline 28
- Stop a Patterned Interruption: Pipeline 29
- Start a Patterned Interruption: Location 30
- Stop a Patterned Interruption: Location 31
- Start a Constant Interruption: Location 32
- Stop a Constant Interruption: Location 33
- Check Interrupt Status: Location 34
- Checking the GPS Information of a MERLIN TR Monitor 35
- SMS Message Store 36
- Troubleshooting iCPSM 38

Introduction to the MERLIN Interrupter

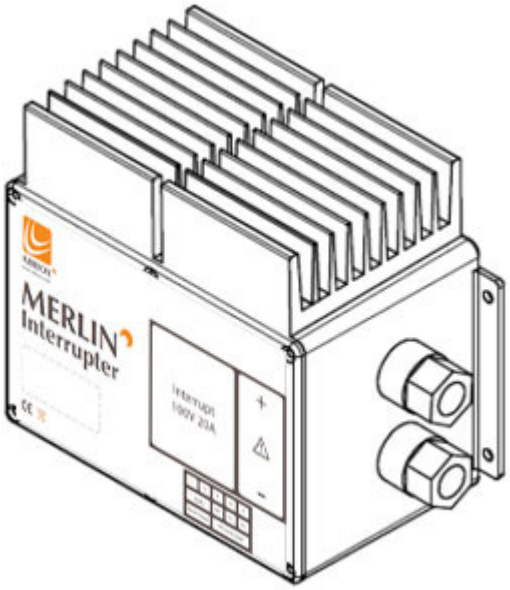
The MERLIN Interrupter is designed specifically for precise solid state interruption of a Transformer Rectifier's (TR) output when connected to a buried pipeline.

Used with any 5-channel MERLIN TR Monitor, it can be used for switching the TR output on and off remotely and for measurement of the instant OFF potential at the TR.

Used with an interruption-ready 5-channel MERLIN TR Monitor, it provides fully automated synchronised interruption. This is typically used for Close Interval Protection Surveys (CIPS), Direct Current Voltage Gradient (DCVG) surveys and for major on/off surveys at CP Test Posts.

Features:

- Full Remote Control
- GPS Synchronisation
- Electromechanical Failsafe
- CIPS Surveys
- DCVG Surveys
- OFF Potential Readings
- 100V, 20A Switching Capability
- Solid State Interruption
- Surge Protection
- Integrated Current Shunt
- Compact Size
- Permanently Installed



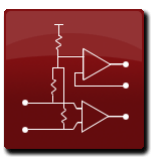
Full Remote Control

Control via the MERLIN 5-channel TR Monitor allows full remote control via mobile phone, CPSM or iCPSM. This feature allows the user to remotely start/stop interruption, get the current interruption status and turn the CP on/off.

GPS Synchronisation

This feature enables MERLIN TR Monitors on the same pipeline to automatically synchronise their output and interrupt it according to a precise timing pattern. Using GPS to synchronise their clocks, automatic true synchronisation is ensured at all times.

Electromechanical Failsafe Relay

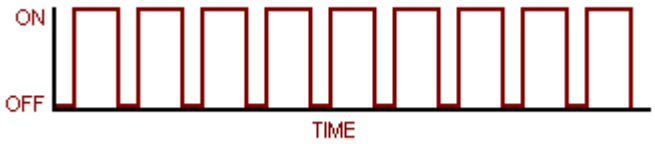


An internal electromechanical relay acts as a failsafe mechanism reconnecting CP if interruption control fails for any reason. This ensures CP protection should any unforeseen problems occur.

Interrupt Modes – Patterned Interruption

The patterns that are supported cater for both CIPS and DCVG surveys.

CIPS surveys usually require the majority of the pattern to be ON to maintain the CP protection of the pipeline.



DCVG surveys are the reverse and usually have a longer OFF than ON so that a short “blip” of ON can be seen by the survey tool.

The following rules must be adhered to when selecting an interrupt pattern or the command will be refused.

Minimum OFF	**0.1 seconds**
Maximum OFF	**4 seconds**
Minimum ON	**0.1 seconds**
Maximum ON	**59.9 seconds**
Minimum complete cycle	**1 second**
Maximum complete cycle	**60 seconds**

To allow all MERLIN TR Monitors to maintain synchronisation, some further restrictions on the patterns are necessary.

Complete cycles must be whole seconds (ON+OFF = complete cycle). A whole number of complete cycles must fit into a 1 minute period (e.g. 1s, 2s, 3s, 4s, 5s, 6s, 10s, 12s, 15s, 20s, 30s and 60s are all fine).

Typical settings for CIPS are:-

0.9s ON	**0.1s OFF**
0.8s ON	**0.2s OFF**
2.5s ON	**0.5s OFF**
4s ON	**1s OFF**

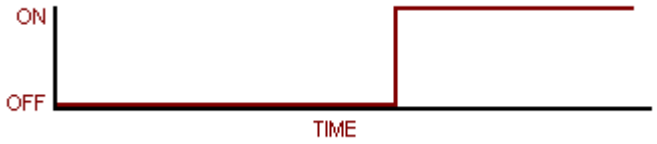
Typical settings for DCVG are:-

0.2s ON	**0.8s OFF**
0.3s ON	**0.7s OFF**
0.4s ON	**0.6s OFF**
0.5s ON	**1.5s OFF**

Other combinations of settings can also be used as long as the above rules are followed.

Interrupt Modes – Constant Interruption

Constant interruption opens the MERLIN Interrupter relay for a set period of time, effectively turning the CP off.



The maximum period of time you can set CP off is governed by the MERLIN TR Monitor firmware version:

Firmware V2.07 and Earlier Versions

If you have V2.07 or an earlier version of firmware, the maximum period over which you can turn the CP off is 12 hours.

Firmware V2.08 and Later Revisions

If you have V2.08 or a later version, the maximum period over which you can turn the CP off is 672 hours (4 weeks) and the units respond with the time and date the CP will be restored.

On all firmware versions, once the CP off duration has expired, CP is restored.

NOTE:
Constant interruption cannot be applied to the entire Pipeline by default. This is to prevent inadvertently turning CP off along the pipeline. To apply a constant interruption to the entire Pipeline, you will need to select and apply constant interruption to the individual Locations within that Pipeline.

Controlling the Interrupter with a Mobile Phone (SMS)

To control the Interrupter using a mobile phone, simply send an SMS message to the MERLIN TR Monitor with the require command.

The MERLIN Interrupter obeys the following list of commands:-

- **cmd:interrupt on:xx off:xx** – Sets interruption pattern
- **cmd:interrupt end** – Stops the current interruption
- **cmd:interrupt status** – Displays the current interruption status
- **cmd:cpoff** – Turns the CP off for a set number of hours*
- **cmd:cpon** – Restores CP
- **cmd:gpsinfo** – Displays the GPS information of the Merlin TR

It is recommended that the commands be stored as SMS templates in your mobile phone to save time and facilitate recollection of specific commands.

To send commands to multiple MERLIN TR Monitors, enter the mobile numbers in the To: field of your SMS Text.

All units will respond with a confirmation message sent back to the operator's mobile phone and HQs (as visualised below) detailing the commands set.

Mobile Phone

HQ1 (and HQ2 if applicable)

Anything other than an interrupt status request will result in a response not only to the sender but also to the HQs.

SMS commands are not case SeNsiTivE to save confusion.

**Prior to V2.08 firmware a maximum of 12 hours can be selected. V2.08 firmware or later will accept 1 to 672 hours (4 weeks).*

Start a Patterned Interruption: cmd:interrupt on:x.x off:x.x

To start a patterned interruption, send an SMS message to the MERLIN TR Monitor remembering to use the correct ON/OFF timing cycles.

Example message to send:-

cmd:interrupt on:0.9 off:0.1

Response back to operator:-

CPM:026 UNIT:10000001 INTERRUPT OK, ON:0.9s OFF:0.1s, TR READS:OFF, SATELLITES:5

Interpreting the response:-

CPM:026 UNIT:10000001 INTERRUPT OK, ON:0.9s OFF:0.1s, TR READS:OFF, SATELLITES:5

Broken down, the response above gives the following information:-

CPM:026	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
INTERRUPT OK	Interrupt Mode is ON
ON:0.9s	CP is on for 0.9 seconds
OFF:0.1s	CP is off for 0.1 seconds
TR READS: OFF	MERLIN TR Monitor readings turned off during interruption*
SATELLITES:5	Number of GPS satellites in view

**Where the ON period or OFF period is too short for the MERLIN TR Monitor to take readings during interruption, the MERLIN TR Monitor will automatically disable reads (whilst interrupting only). The response will indicate whether the MERLIN TR Monitor is able to take readings or not. The unit will still continue to check the AC power even if it cannot take the other readings.*

CIPS Survey Example

CIPS survey timing example, message to send:-

cmd:interrupt on:0.8 off:0.2

This sets the Interrupter to ON for 0.8s and OFF for 0.2s. Example response:-

CPM:026 UNIT:10000001 INTERRUPT OK, ON:0.8s OFF:0.2s, TR READS:OFF, SATELLITES:5

DCVG Survey Example

DCVG survey timing example, message to send:-

cmd:interrupt on:0.3 off:0.7

This sets the Interrupter to ON for 0.3s and OFF for 0.7s. Example response:-

CPM:026 UNIT:10000001 INTERRUPT OK, ON:0.3s OFF:0.7s, TR READS:OFF, SATELLITES:7

Stop a Patterned Interruption: cmd:interrupt end

To immediately stop interruption and set the unit(s) back to default CP mode (CP on), send an SMS message to the MERLIN TR Monitor.

Message to send:-

cmd:interrupt end

Example response back to operator:-

CPM:026 UNIT:10000001 OK, CP IS ON, INTERRUPTING IS OFF

Interpreting the response:-

CPM:026 UNIT:10000001 OK, CP IS ON, INTERRUPTING IS OFF

Broken down, the response above gives the following information:-

CPM:026	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
CP IS ON	CP is ON
INTERRUPTING IS OFF	Interrupt Mode is OFF

Check Interrupt Status: cmd:interrupt status

To check the current interruption status at any time, send an SMS message to the MERLIN TR Monitor.

Message to send:-

cmd:interrupt status

Example response back to operator:-

CPM:026 UNIT:10000001 INTERRUPT OK, ON:0.8s OFF:0.2s, TR READS:OFF, SATELLITES:6

The units will respond with the confirmation message sent back to the operator's mobile phone. The "**cmd:interrupt status"** command is the only command that will **NOT** report back to HQs. All other commands sent to MERLIN TR Monitors will send the response back to the operator's mobile phone **AND** the listed HQs. This ensures historic information is maintained for auditing and compliance.

Interpreting the response:-

CPM:026 UNIT:10000001 INTERRUPT OK, ON:0.8s OFF:0.2s, TR READS:OFF, SATELLITES:6

Broken down, the response above gives the following information:-

CPM:026	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
INTERRUPT OK	Interrupt Mode is ON
ON:0.8s	CP is on for 0.8 seconds
OFF:0.2s	CP is off for 0.2 seconds
TR READS: OFF	MERLIN TR Monitor readings turned off during interruption
SATELLITES:6	Number of GPS satellites in view

Start a Constant Interruption: cmd:cpoff xx

To start a constant interruption for a set period of time, send an SMS message to the MERLIN TR Monitor. This command will end any other interrupter activity.

Firmware V2.07 and Earlier Versions
If you have V2.07 or an earlier version of firmware, the maximum time you can turn the CP off is 12 hours.

Example message to send:-

cmd:cpoff 12

Response back to operator:-

CPM:032 UNIT:10000001 OK, CP OFF UNTIL 23:37

Interpreting the response:-

CPM:032 UNIT:10000001 OK, CP OFF UNTIL 23:37

Broken down, the response above gives the following information:-

CPM:032	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
CP OFF UNTIL 23:37	Constant Interrupt Mode is ON until 23:37*

**assuming you sent the message at 11:37.*

Firmware V2.08 and Later Revisions
If you have V2.08 or a later version, the maximum time you can turn the CP off is 672 hours (4 weeks) and the units respond with the time and date the CP will be restored.

Example message to send:-

cmd:cpoff 72

Response back to operator:-

CPM:032 UNIT:10000001 OK, CP OFF UNTIL 12:17:01 MON 1 SEPT 2009 (TIME ZONE GMT+1:00)

Interpreting the response:-

CPM:032 UNIT10000001 OK, CP OFF UNTIL 12:17:01 MON 1 SEPT 2009 (TIME ZONE GMT+1:00)

Broken down, the response above gives the following information:-

CPM:032	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
CP OFF UNTIL 12:17	Constant Interrupt Mode is ON until 12:17
MON 1 SEPT 2009	Date which CP will be restored
(TIME ZONE GMT+1:00)	The set Timezone for the MERLIN TR Monitor

Stop a Constant Interruption: cmd:cpon

To immediately stop a constant interruption, send an SMS message to the MERLIN TR Monitor.

Message to send:-

cmd:cpon

Example response back to operator:-

CPM:033 UNIT:10000001 OK, CP IS ON, INTERRUPTING IS OFF

Interpreting the response:-

CPM:033 UNIT:10000001 OK, CP IS ON, INTERRUPTING IS OFF

Broken down, the response above gives the following information:-

CPM:033	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
CP IS ON	CP is ON
INTERRUPTING IS OFF	Interruption is OFF

Check Interrupt Status: cmd:interrupt status

To check the current interrupt status at any time, send an SMS message to the MERLIN TR Monitor.

Message to send:-

cmd:interrupt status

Example response back to operator (V2.08+ firmware):-

CPM:026 UNIT:10000001 OK, CP OFF UNTIL 12:17:01 MON 1 SEPT 2009 (TIME ZONE GMT+1:00)

Interpreting the response:-

CPM:026 UNIT:10000001 OK, CP OFF UNTIL 12:17:01 MON 1 SEPT 2009 (TIME ZONE GMT+1:00)

Broken down, the response above gives the following information:-

CPM:026	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
CP OFF UNTIL 12:17	Constant Interrupt Mode is ON until 12:17
MON 1 SEPT 2009	Date which CP will be restored
(TIME ZONE GMT+1:00)	The set Timezone for the MERLIN TR Monitor

The units will respond with the confirmation message sent back to the operator's mobile phone. The "**cmd:interrupt status"** command is the only command that will **NOT** report back to the HQs. All other commands sent to MERLIN TR Monitors will send the response back to the operator's mobile phone **AND** the HQs. This ensures historic information is maintained for auditing and compliance.

Checking the GPS Information of a MERLIN TR: cmd:gpsinfo

Reports the unit's position, the number of satellites it can see and the status of the GPS and GPS antenna.

All MERLIN TR Monitors will automatically be synchronised in time with each other provided they have GPS lock. The synchronisation error is less than 1ms.

At a new installation when power is first applied it can take up to 20 minutes for the unit to gain GPS lock. If interruption is started before the GPS has lock, the cycle will be corrected and brought into synchronisation when GPS lock is acquired.

The GPS position is reported as latitude and longitude in degrees. The latitude and longitude can be entered directly into Google Maps or other mapping software to show the exact location (within 5 metres).

Message to send:-

cmd:gpsinfo

Example response back to operator:-

CPM:031 UNIT:10000001 GPS VALID:Y LAT:53.4301 LONG:-2.6527 SATELLITES:4 ANTENNA OK:Y

The units will respond with the confirmation message sent back to the operator's mobile phone and the HQs detailing the commands set.

Interpreting the response:-

CPM:031 UNIT:10000001 GPS VALID:Y LAT:51.4301 LONG:-2.6527 SATELLITES:4 ANTENNA OK:Y

Broken down, the response above gives the following information:-

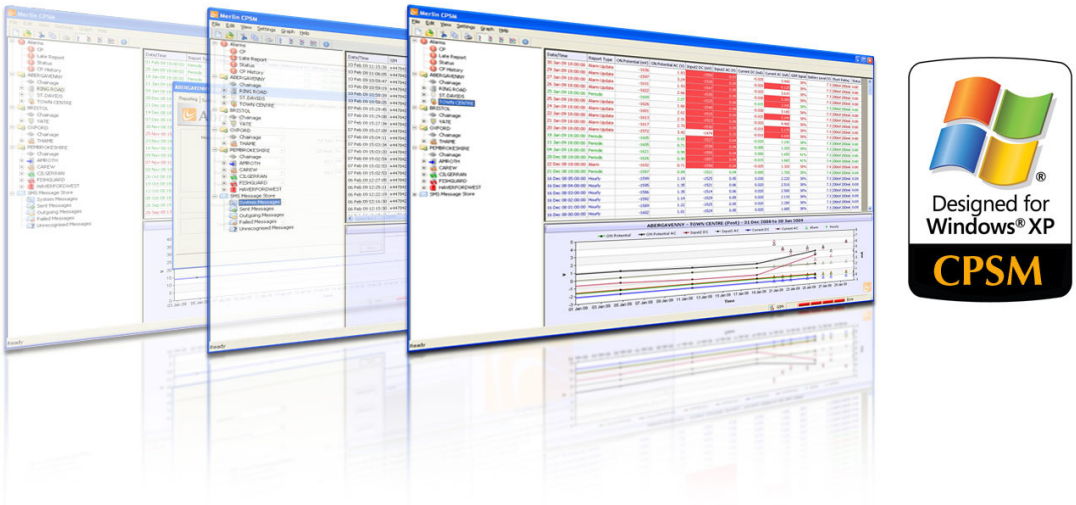
CPM:031	Message Code
UNIT:10000001	Serial Number of the MERLIN TR Monitor
GPS VALID:Y	Signifies the GPS Signal is valid
LAT:51.4301	Shows the Latitude
LONG:-2.6527	Shows the Longitude
SATELLITES:4	Displays number of satellites in view
ANTENNA OK:Y	Shows the GPS antenna is connected

Troubleshooting SMS Messages

Command Sent	Message Prefix	Error Message in Response	Meaning
cmd:interrupt on:x.x off:x.x	CPM:026	INTERRUPT ERROR, CYCLE INVALID	Interrupt ON/OFF cycle sum must = whole seconds. See page 6 for details
		INTERRUPT ERROR, ON INVALID (0.1s to 59.9s allowed)	Ensure cycle is within ON limits
		INTERRUPT ERROR, OFF INVALID (0.1s to 4.0s allowed)	Ensure cycle is within OFF limits
		INTERRUPT WARNING, ON:X.Xs OFF:X.Xs BUT NOT SYNCHRONISED	GPS not locked, unit will continue to interrupt and will synchronise when GPS lock has been achieved.
		ERROR, NO EXTERNAL POWER	Check MERLIN TR Monitor has external AC Power
		INTERRUPT ERROR, NO GPS	MERLIN TR Monitor is not GPS enabled
cmd:interrupt end	CPM:026		
cmd:interrupt status	CPM:026	INTERRUPT ERROR, CYCLE INVALID	Interrupt ON/OFF cycle sum must = whole seconds
		INTERRUPT ERROR, ON INVALID	Ensure cycle is within ON limits
		INTERRUPT ERROR, OFF INVALID	Ensure cycle is within OFF limits
		INTERRUPT WARNING, ON:X.Xs OFF:X.Xs BUT NOT SYNCHRONISED	GPS not locked, unit will continue to interrupt and will synchronise when GPS lock has been achieved.
		ERROR, NO EXTERNAL POWER	Check MERLIN TR Monitor has external AC Power
		INTERRUPT ERROR, NO GPS	MERLIN TR Monitor is not GPS enabled
cmd:cpoff	CPM:032	ERROR, NO EXTERNAL POWER	Check Merlin TR has external AC power
		ERROR, INVALID NUMBER OF HOURS	Check the maximum number of hours entered. Firmware V2.07 12hrs Max. V2.08 672hrs Max.
cmd:cpon	CPM:033		
cmd:gpsinfo	CPM:031	GPS VALID:N	GPS has not yet achieved satellite lock. This can take up to 20 minutes from start.
		ANTENNA OK:N	Check GPS Antenna is connected
		GPS TURNED OFF	Check MERLIN TR Monitor has external AC Power
		NO GPS FITTED	MERLIN TR Monitor is not GPS enabled
		SATELLITES:0	No visible satellites. Check power and change GPS antenna location/position.
Any command		ERROR, BAD COMMAND	Message has been sent to MERLIN Test Post. This command only works with the MERLIN TR Monitor.

Controlling the Interrupter via CPSM

MERLIN **CPSM** is a database software package for displaying, archiving and exporting data from MERLIN TR Monitors and Test Post (TP) Monitors. It also provides full remote configuration of all units via GSM.



Monitors can be configured to send their data to two HQs - this can be useful where CP Engineers are located in different offices – or even in different countries.

Each HQ requires its own copy of **CPSM**; changes made at one HQ are automatically updated at the other HQ with a full audit trail of all changes made to the system.

A **CPSM Viewer** is also available and allows third parties to view Merlin data only, blocking access to the configuration features.

CPSM and the **CPSM Viewer** are distributed uniquely by Abriox.

For further information please visit:

www.abriox.com

CPSM has been designed to be as user friendly as possible; with little effort the user can effectively control the full CP from the comfort of an office PC.

Interruption is offered in 2 modes:

Patterned Interruption
Constant Interruption

The patterns that are supported cater for both CIPS and DCVG surveys. Constant Interruption opens the interrupter relay, effectively turning the CP off for a defined period of time.

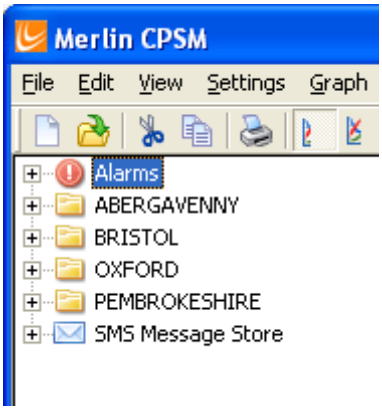
Within the **CPSM** software, the system is broken down for ease of use:

Pipelines
Locations

Pipeline is the entire pipeline length under CP monitoring which can contain unlimited Transformer Rectifier (TR) Locations.

NOTE:
As a precautionary feature, Pipelines will only accept Patterned Interruption. You cannot apply a Constant Interruption. This is to avert accidentally turning off the CP for the entire pipeline.

In the example below we have 4 pipelines; Abergavenny, Bristol, Oxford and Pembrokeshire.



Abergavenny has 1 location (1 TR)

Bristol has 0 locations (0 TR)

Oxford has 1 location (1 TR)

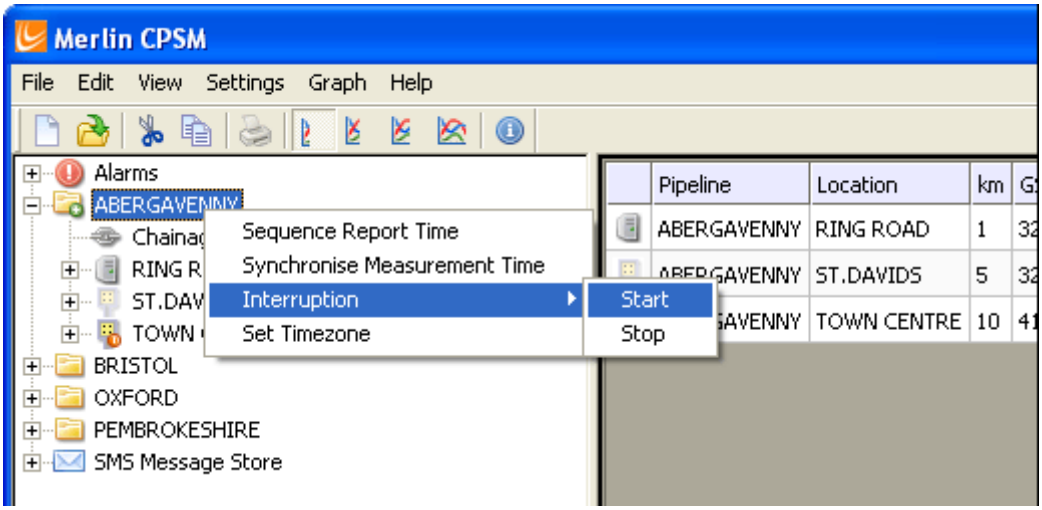
Pembrokeshire has 5 locations (5 TR)

Graphically this can be viewed as:-

Start a Patterned Interruption: Pipeline

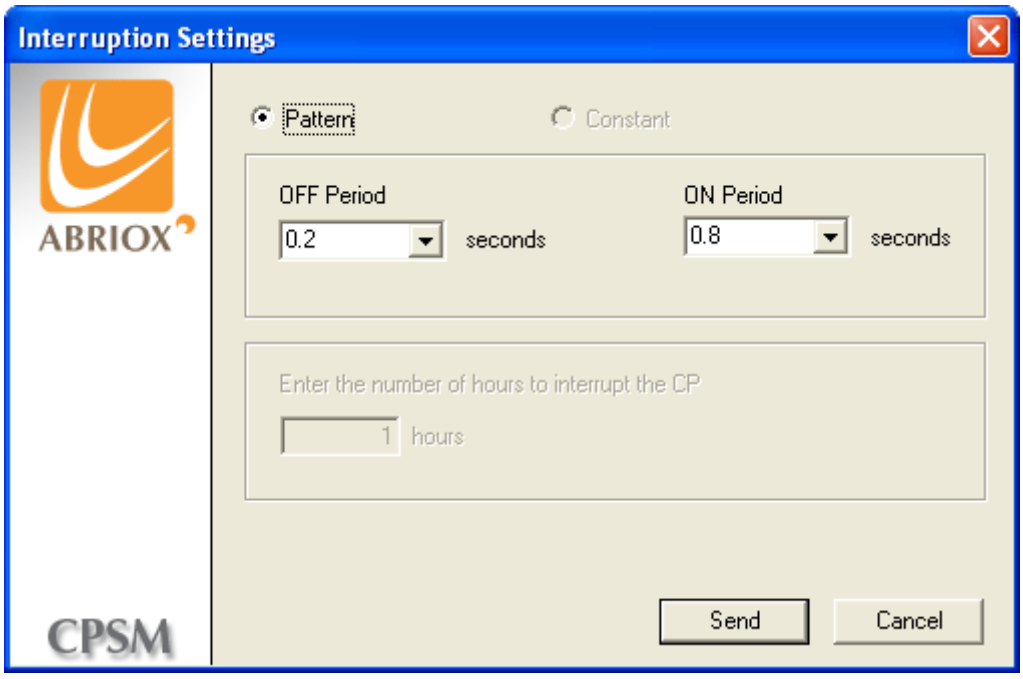
Interrupting at the Pipeline level will set all MERLIN TR Monitors on that pipeline into Interrupt mode.

Right-click on the **Pipeline** – from the menu, select **Interruption** – **Start**.



This will open a new window allowing you to enter the timing sequence for the patterned interruption as required.

Using the drop-down menus, select the required timing pattern. The software will automatically provide suitable timing for the ON and OFF periods.

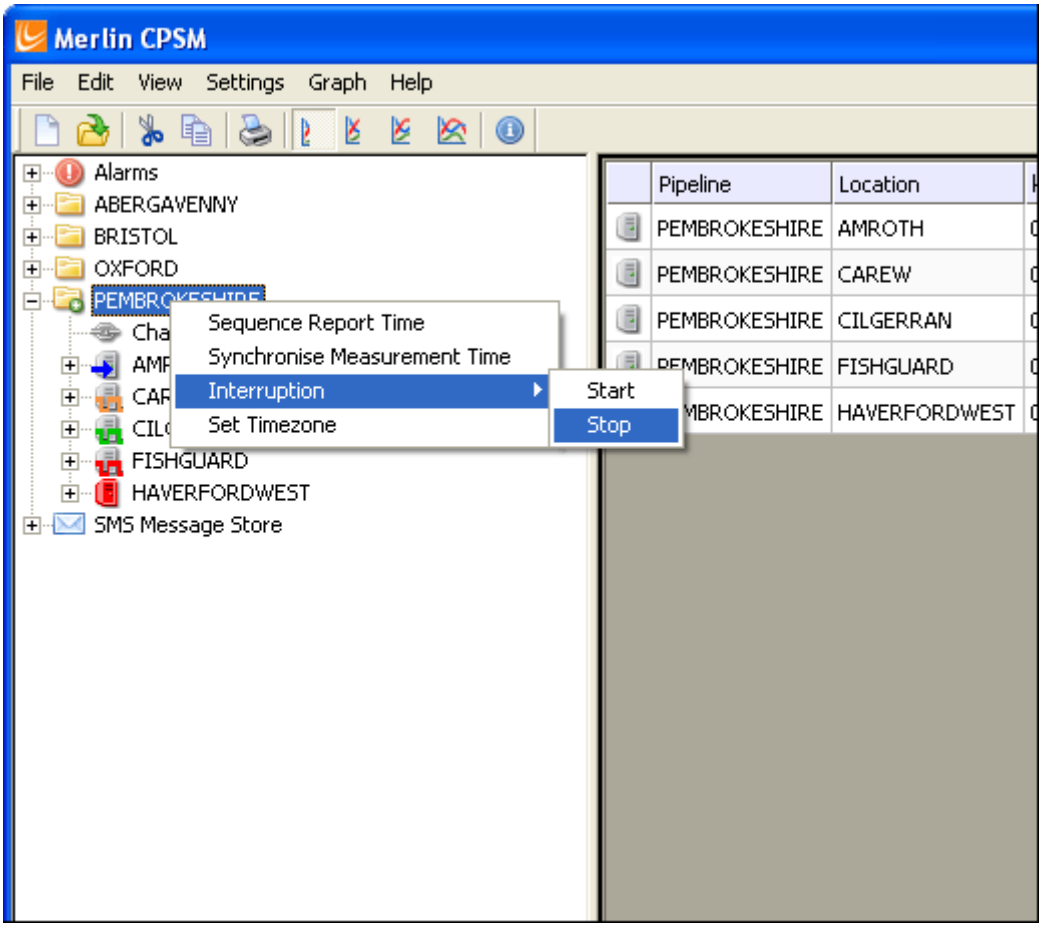


Click **Send** to start interruption. All MERLIN TR Monitors on that pipeline will automatically be synchronised in time with each other, provided they have GPS lock.

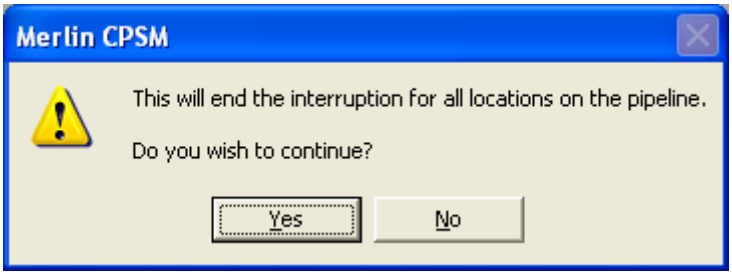
The Location icons will all change state (depending on status). When in successful Patterned Interruption the icons will appear as:

Stop a Patterned Interruption: Pipeline

To stop an interruption at any time, right-click the **Pipeline**. From the menu select **Interruption** – **Stop**.



A notification window will pop up asking you to confirm ending the interruption. Click **Yes** to stop the interruption or **No** to cancel.

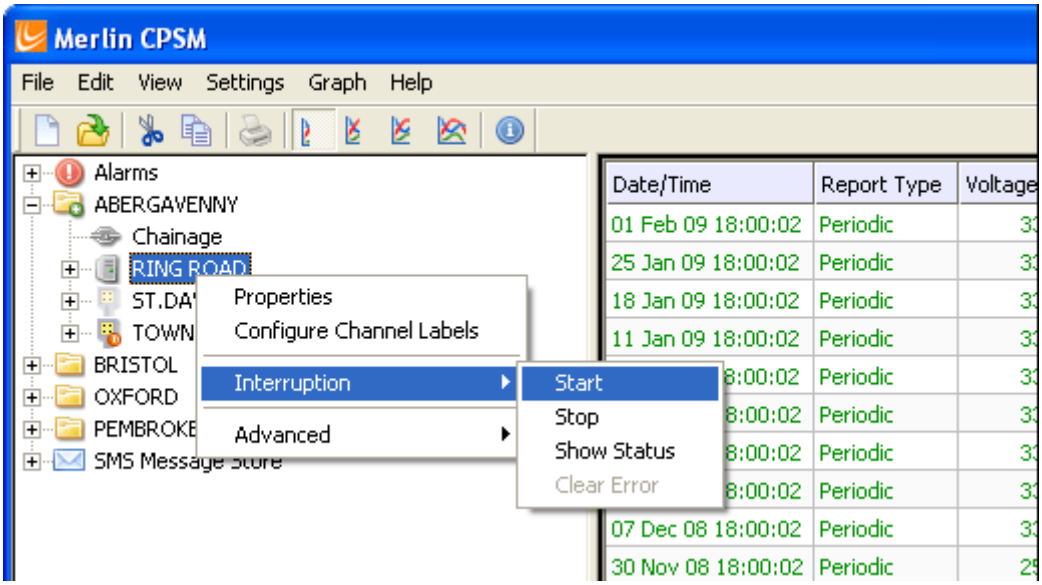


This will effectively turn CP back on for all Locations on that Pipeline.

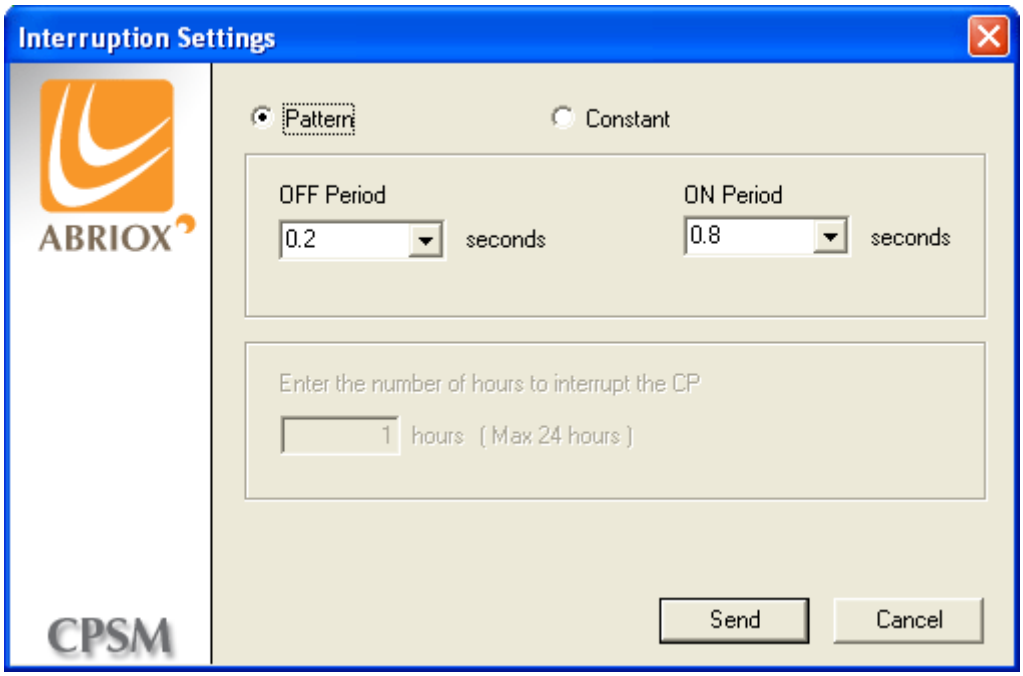
Once interruption has stopped, the icons will change back to the default active state:

Start a Patterned Interruption: Location

Interrupting at the Location level will only affect the selected MERLIN TR Monitors into Interrupt mode. Right-click on **Location** – from the menu, select **Interruption** – **Start**.



This will open a new window allowing you to enter the timing sequence for the patterned interruption.

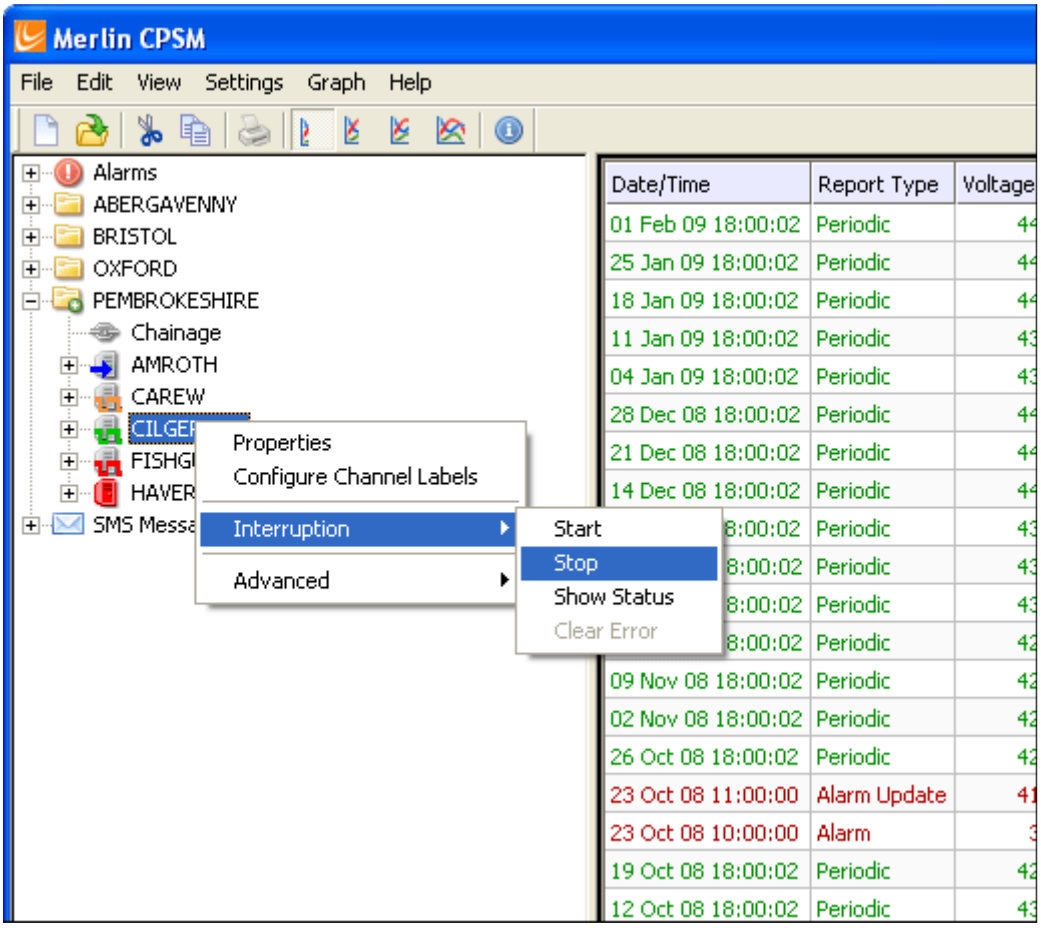


Using the drop-down menus, select the required timing pattern. The software will automatically provide suitable timing for the ON and OFF times. Click **Send** to start interruption.

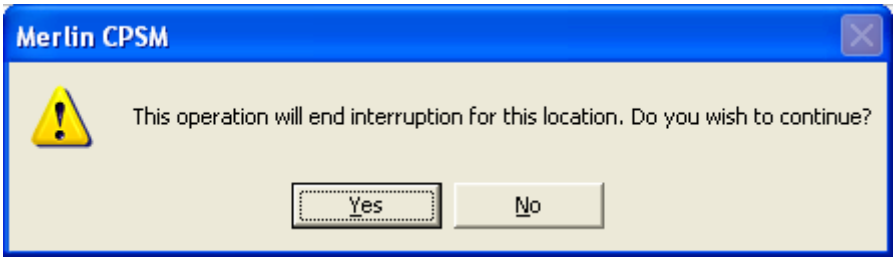
As the unit receives the interrupt command, the icon will change to show interruption is taking place:

Stop a Patterned Interruption: Location

To stop an interruption at any time, right-click the **Location**. From the menu select **Interruption** – **Stop**.



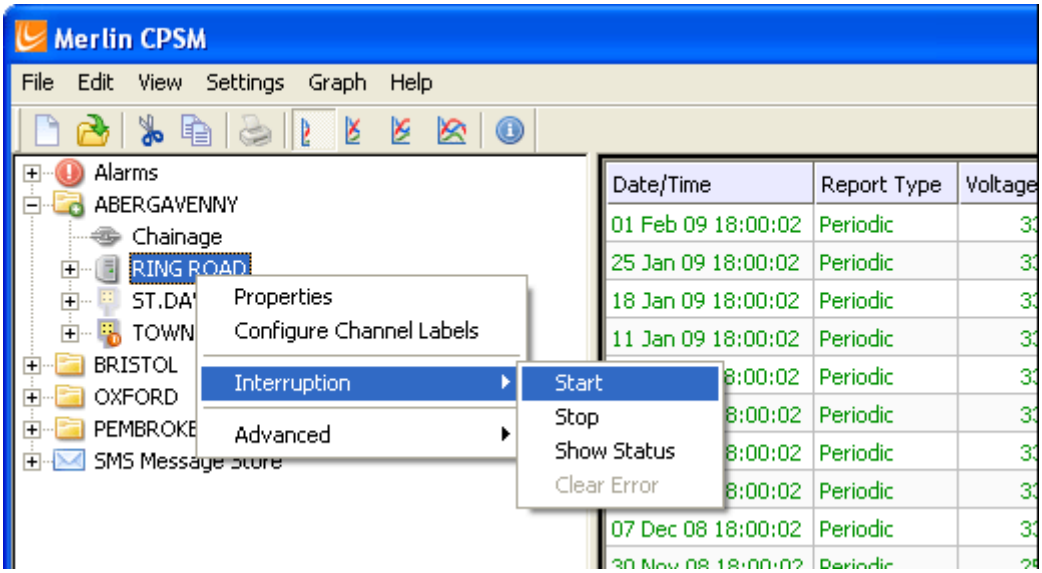
A notification window will pop up asking you to confirm ending the interruption. Click **Yes** to stop the interruption or **No** to cancel.



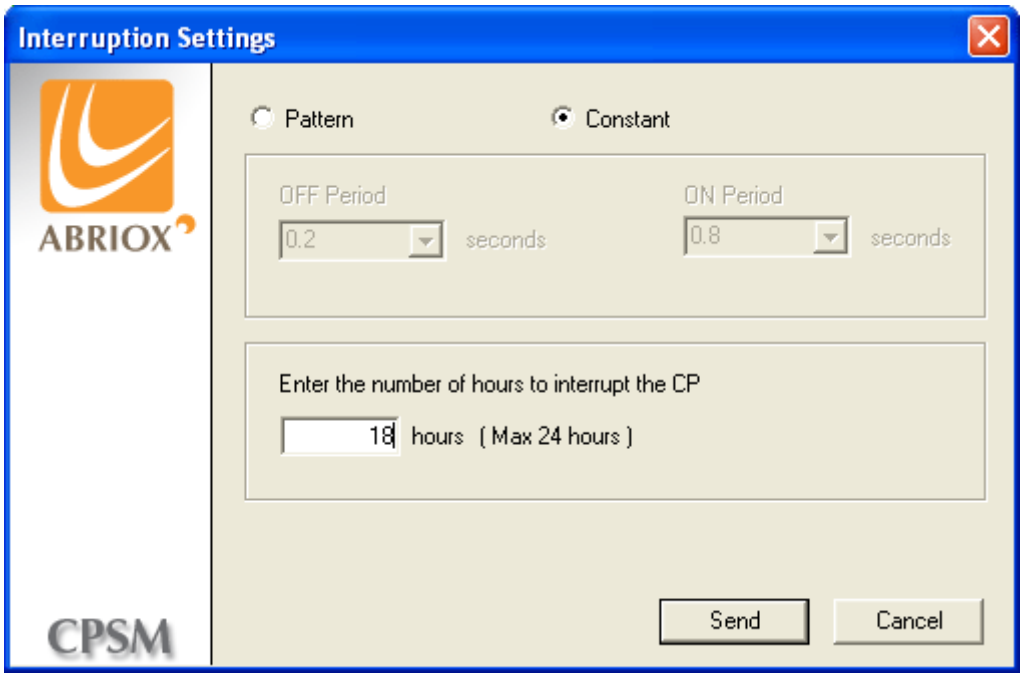
Upon successful interruption stoppage, the icon will change back to its default state:

Start a Constant Interruption: Location

Interrupting at the Location level will only affect the selected MERLIN TR Monitors into Interrupt mode. Right-click on **Location** – from the menu, select **Interruption** – **Start**.



This will open a new window allowing you to select Constant and enter the number of hours you require the CP to be turned off. The system will automatically limit the maximum number of hours depending on the version of firmware installed.

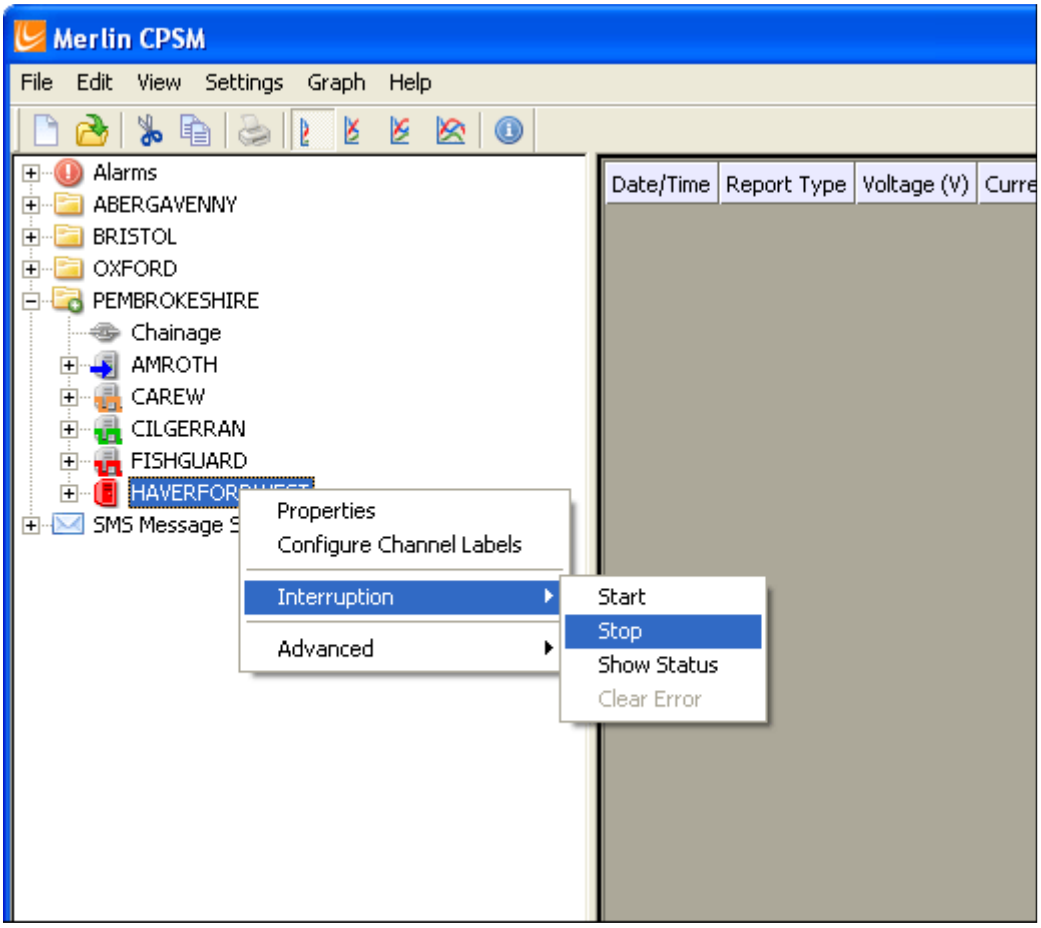


Select the number of hours for the CP to be turned off and click **Send**.

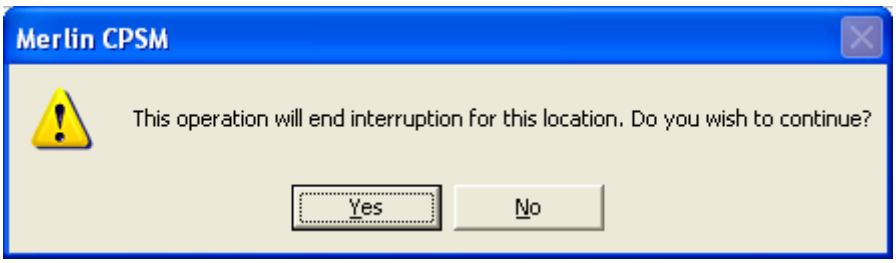
When Constant Interruption is active, the Location icon will change state:

Stop a Constant Interruption: Location

To stop an interruption at any time, right-click the **Location**. From the menu select **Interruption** – **Stop**.



A notification window will pop up asking you to confirm ending the interruption. Click **Yes** to stop the interruption or **No** to cancel.



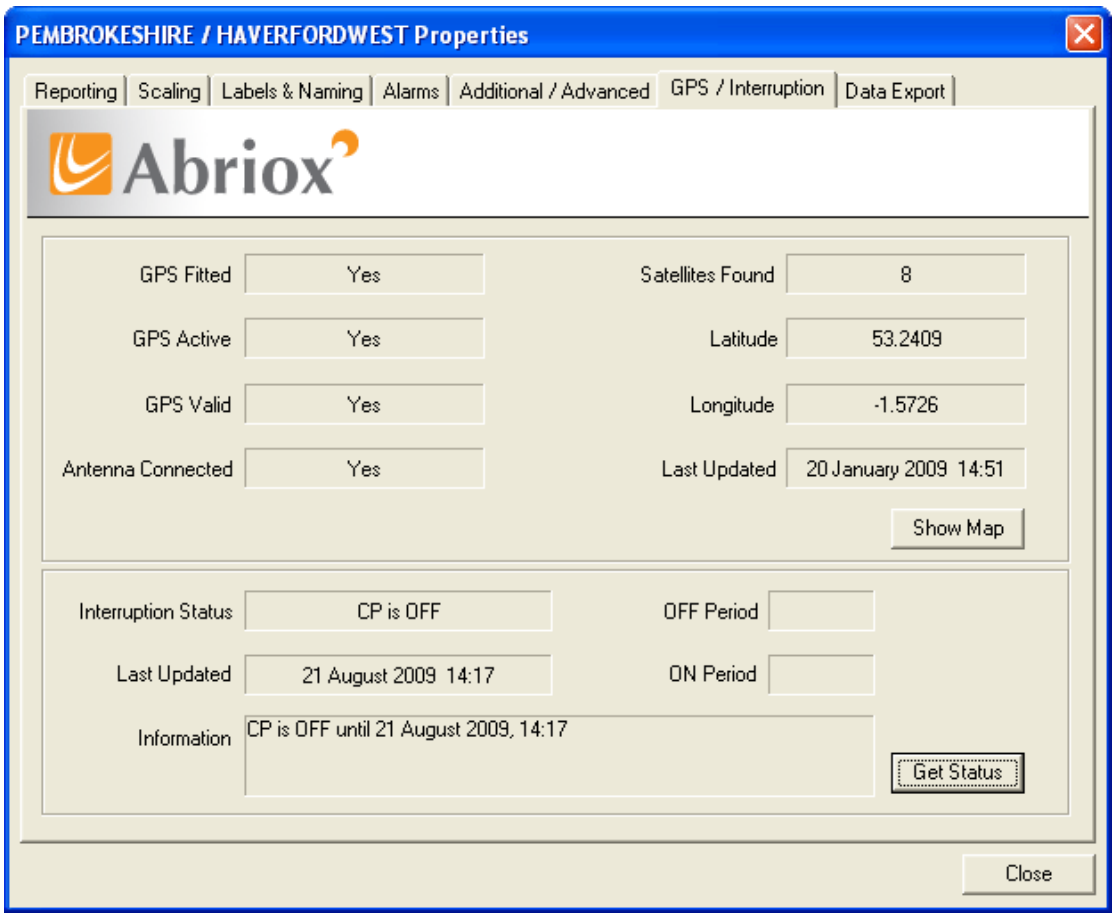
Upon successful interruption stoppage, the icon will change back to its default active state:

Check Interrupt Status: Location

To view the interrupt status at any time, right-click on the desired **Location** – from the menu, select **Interrupt** – **Show Status**.

Alternatively, right-click on the desired **Location** – from the menu, select **Properties** then select the **GPS/Interruption** tab.

This will open a new window displaying the current interruption status for that Location. Click the **Get Status** button for the current Interruption Status.



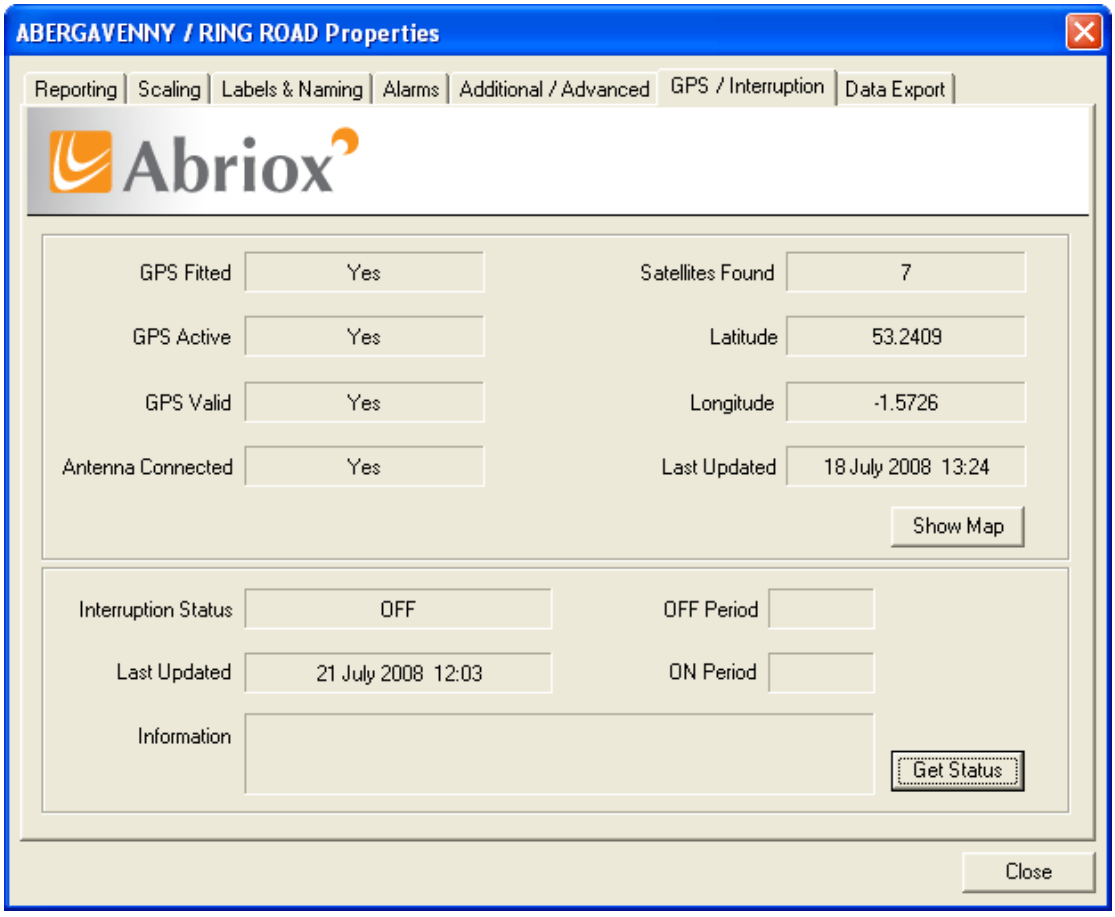
Alternatively, you can view the current Location status from the main window of the **CPSM** software. The icons for the Locations advise the user of their current status, as shown below:-

Icon	Description
	TR unit is active and in normal operation
	TR unit is inactive
	TR unit – CP is OFF
	Message sent – awaiting response from unit
	Interruption is under way but has warnings
	Interruption is active
	Interruption has failed

Checking the GPS Information of a Merlin TR

To view the GPS information of a MERLIN TR Monitor, right-click on the **Location;** from the menu select **Properties**. In the new window, click the **GPS/Interruption** tab.

The window details the unit's position, the number of satellites it can see and the status of the GPS and GPS antenna.



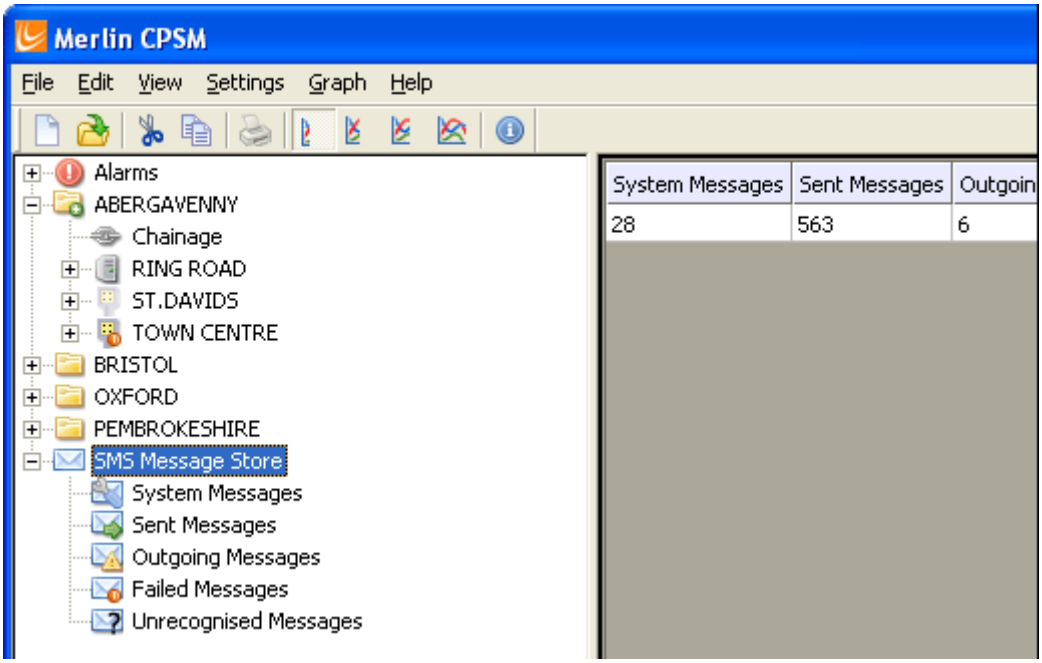
The GPS position is reported as latitude and longitude in degrees. The unit position can be viewed in Google Maps by clicking the **Show Map** button. This will open the default browser installed on the PC and display the coordinates in Google Maps.

Click the **Close** button to return to the main screen.

SMS Message Store

CPSM is based on GSM communications. For all actions made in **CPSM**, an SMS message is sent to the unit in the field, effectively telling it what the user wants it to do. The units then reply back with an SMS message to confirm the action or request.

The **SMS Message Store** is an easy way to view the entire command history of your system.



Selecting the relevant store folder displays the information on the right side of the window.

Date/Time	SIM	Message
10 Feb 09 11:15:38	+447842146233	CPM:026 UNIT:10000201 INTERRUPT WARNING, ON:0.8s OFF:0
10 Feb 09 11:06:05	+447842146233	CPM:009 UNIT:10000201 MTIME:18:00 RDAY:MON RTIME:02:04
10 Feb 09 10:59:47	+447842146233	CPM:026 UNIT:10000201 OK, CP IS ON, INTERRUPTING IS OFF
10 Feb 09 10:59:19	+447842146233	CPM:026 UNIT:10000201 INTERRUPT WARNING, ON:0.8s OFF:0
10 Feb 09 10:58:39	+447842146233	CPM:026 UNIT:10000201 OK, CP IS ON, INTERRUPTING IS OFF

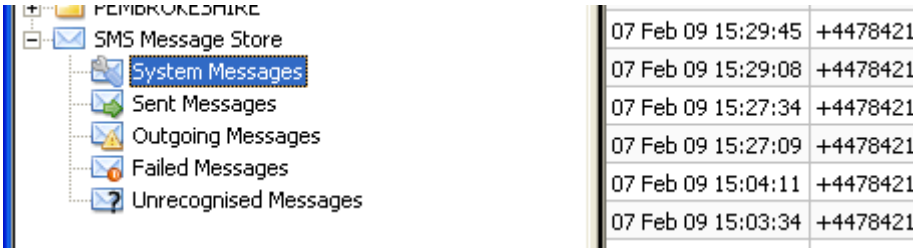
Typical information shown:-

- Date and time the message was sent
- SIM number the message was sent to or from
- Message sent
- Number of retries left

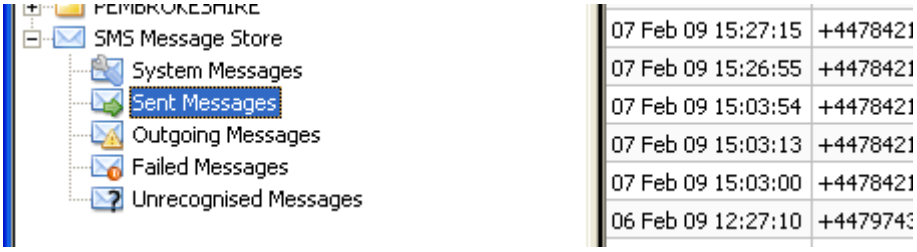
By selecting the top level **SMS Message Store** you can view the entire SMS Status.

System Messages	Sent Messages	Outgoing Messages	Failed Messages	Unrecognised Messages
28	563	6	13	4

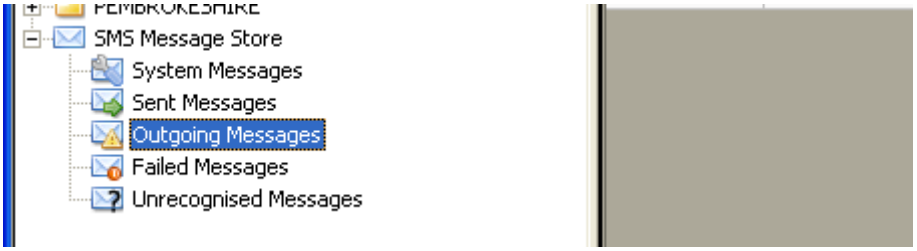
System Messages – displays messages received from the units. These can be used to verify an action has been carried out.



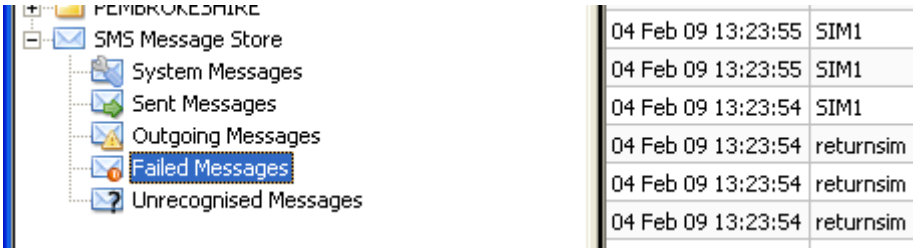
Sent Messages – displays the messages sent from **CPSM** to the units.



Outgoing Messages – displays any text messages waiting to be sent and the number of retries left.



Failed Messages – displays any failed messages sent to the units in the field.



Unrecognised Messages – displays any messages that were unrecognised by the system.

Troubleshooting CPSM

CPSM software reports no modem is connected:

Please ensure modem is connected and the correct drivers installed. See the CPSM User Manual for more information.

CPSM software reports no GSM signal:

Move the antenna to a location where there is a better phone signal.

Location reports Interruption Status is Active with Warnings:

One of the MERLIN TR Monitors does not have GPS Lock. Interruption will continue and full synchronisation will occur once GPS Lock has been achieved.

Location reports Interrupt Status is Pending:

CPSM has sent the message and is awaiting a response. Wait a few minutes; if nothing comes through check the status. Right-click on the Location, select Properties. Click on the GPS/Interruption tab, click the button "Get Status". This should "push" the message through.

Location reports Interrupt Status as Failed:

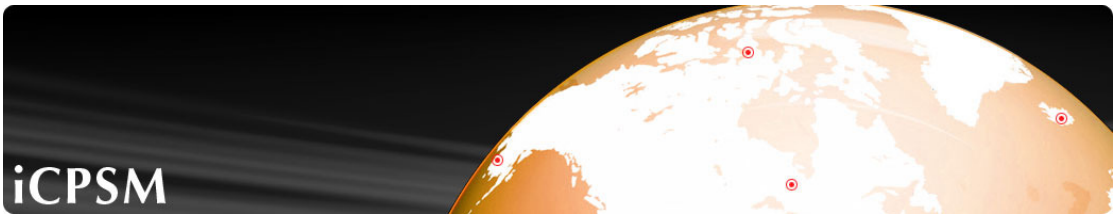
Right-click on the Location, select Properties. Click on the GPS/Interruption tab. Most errors of this kind are described in this tab, they are usually hardware-related, such as no power supply.

Visual Aids:

The Location icons change depending on their status. This can be used as a visual aid to diagnosing problems.

Icon	Description
	TR unit is active and in normal operation
	TR unit is inactive
	TR unit – CP is OFF
	Message sent – awaiting response from unit
	Interruption is under way but has warnings
	Interruption is active
	Interruption has failed

Controlling the Interrupter via iCPSM

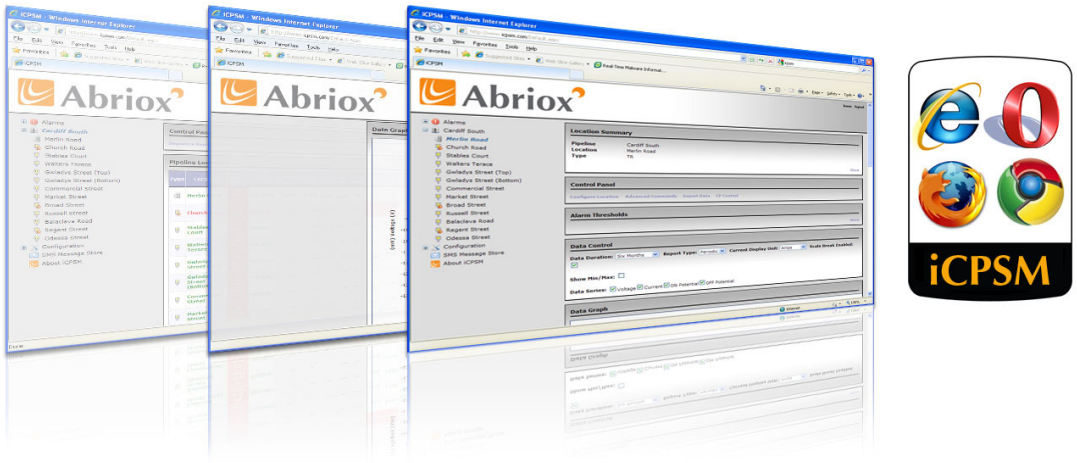


iCPSM is the online version of our highly acclaimed **CPSM** software. **iCPSM** enables clients to view CP data from MERLIN TR Monitors via a web browser.

Clients selecting this method access their CP data via Abriox's **iCPSM** website. Data is held in a secure database, hosted by Abriox servers where it can be viewed and downloaded.

The great advantage of **iCPSM** is that multiple users can access their company's data across the internet with no requirement for special software or set-up – and upgrades to the **iCPSM** software are immediately implement and available for all users.

So, no matter where in the world your users are - as long as they have access to the internet - they can access and use **iCPSM**.



An **iCPSM Viewer** is also available and allows third parties to view MERLIN data only, blocking access to the configuration features.

iCPSM and the i**CPSM Viewer** are distributed uniquely by Abriox.

For further information please visit:

www.abriox.com

iCPSM has been designed to be as user-friendly as possible; with little effort the user can effectively control the full CP from the comfort of any internet-accessible PC.

Interruption is offered in 2 modes:

Patterned Interruption
Constant Interruption

The patterns that are supported cater for both CIPS and DCVG surveys. Constant Interruption opens the interrupter relay, effectively turning the CP off for a defined period of time.

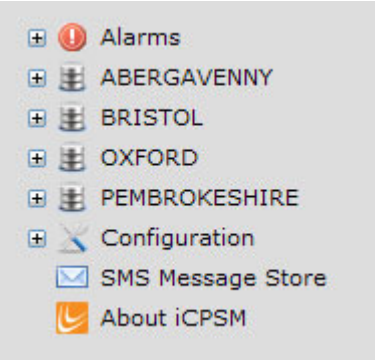
Within the **iCPSM** software, the system is broken down for ease of use:

Pipelines
Locations

Pipeline is the entire pipeline length under CP which can contain unlimited Transformer Rectifier (TR) Locations.

NOTE:
As a precautionary feature, Pipelines will only accept Patterned Interruption. You cannot apply a Constant Interruption. This is to avert accidentally turning off the CP for the entire pipeline.

In the example below we have 4 pipelines; Abergavenny, Bristol, Oxford and Pembrokeshire.



Abergavenny has 1 location (1 TR)

Bristol has 0 locations (0 TR)

Oxford has 1 location (1 TR)

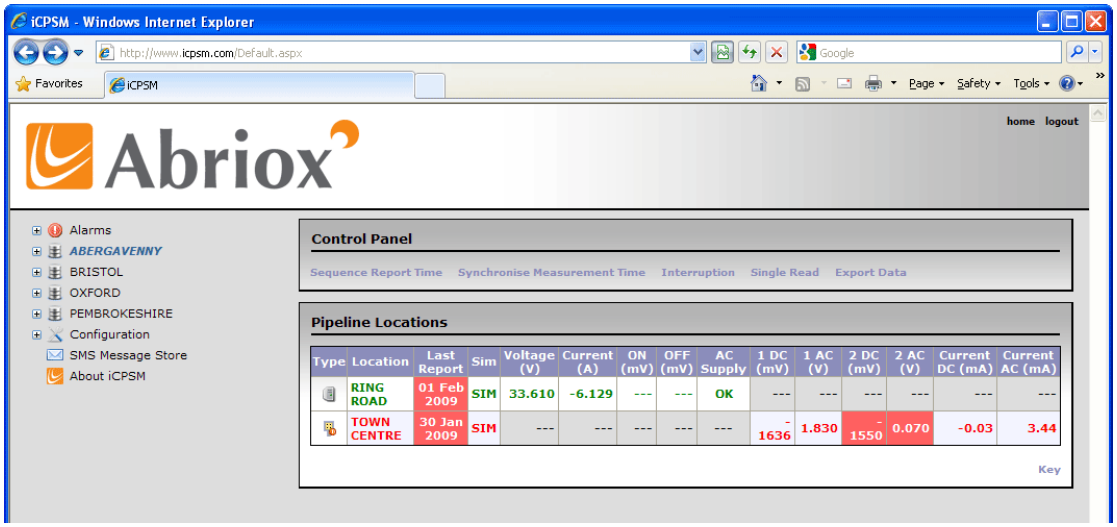
Pembrokeshire has 5 locations (5 TR)

Graphically this can be viewed as:-

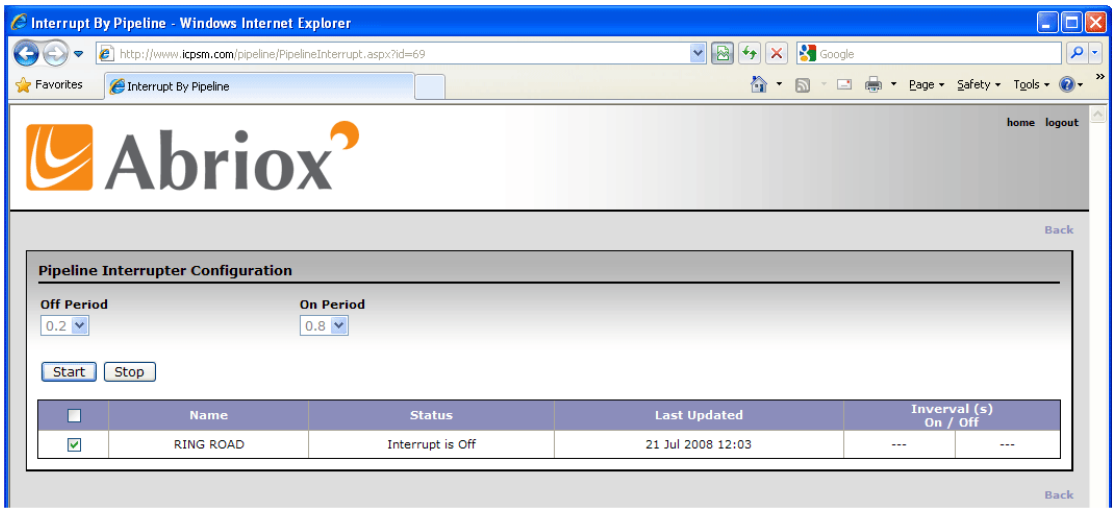
Start a Patterned Interruption: Pipeline

Interrupting at the Pipeline level will set all MERLIN TR Monitors on that pipeline into Interrupt mode.

Select the **Pipeline** on the left-hand side of the page, then click the **Interruption** link under **Control Panel** located on the right-hand side of the page.



This will open a new page allowing you to enter the timing sequence for the patterned interruption as required. Using the drop-down menus, select the required timing pattern. The software will automatically provide suitable timing for the ON and OFF periods.



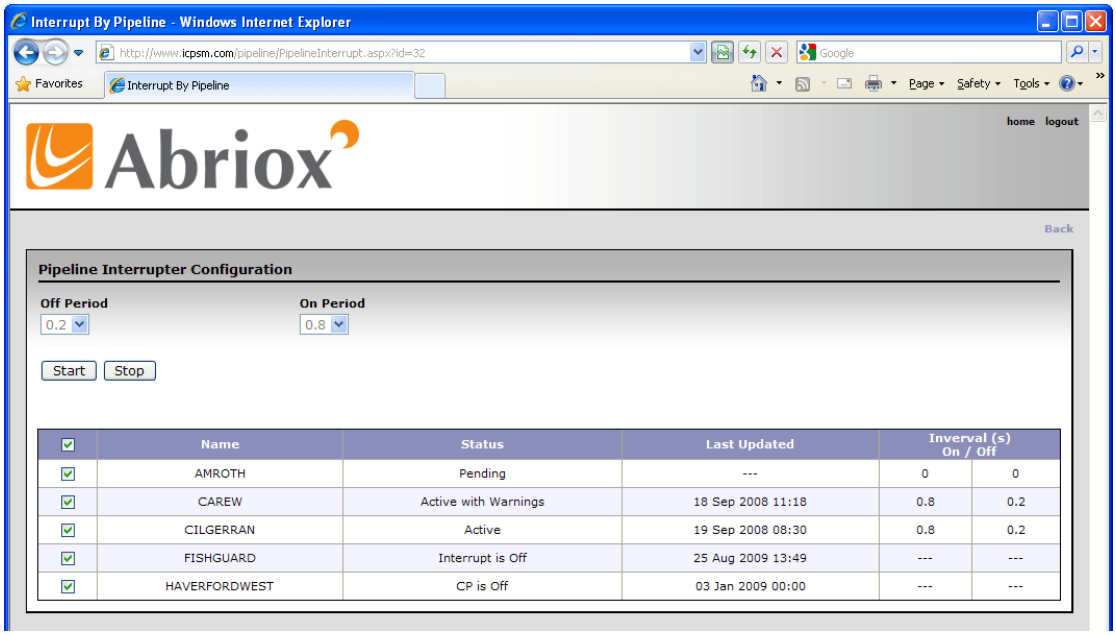
Click the **Start** button to start the interruption. All MERLIN TR Monitors selected on that pipeline will automatically be synchronised in time with each other (provided they have GPS lock).

Click the **Back** link to return to the main page.

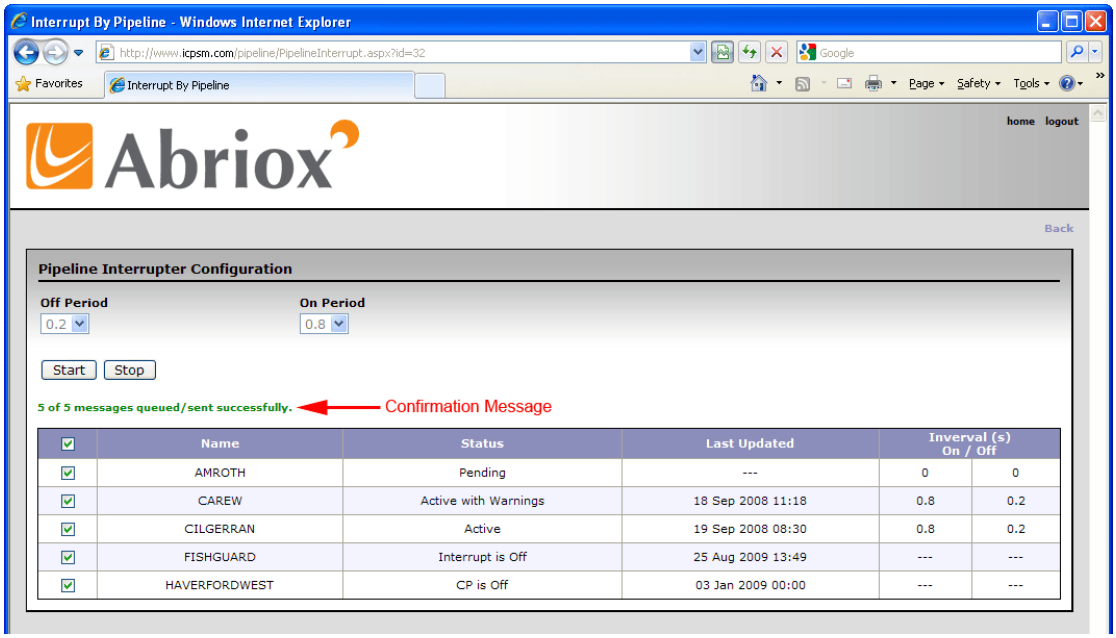
The Location icons will all change state (depending on status). When in successful Patterned Interruption the Location icons will appear as:

Stop a Patterned Interruption: Pipeline

To stop an interruption at any time, select the **Pipeline** then click the **Interruption** link. The page will display all Locations for that Pipeline.



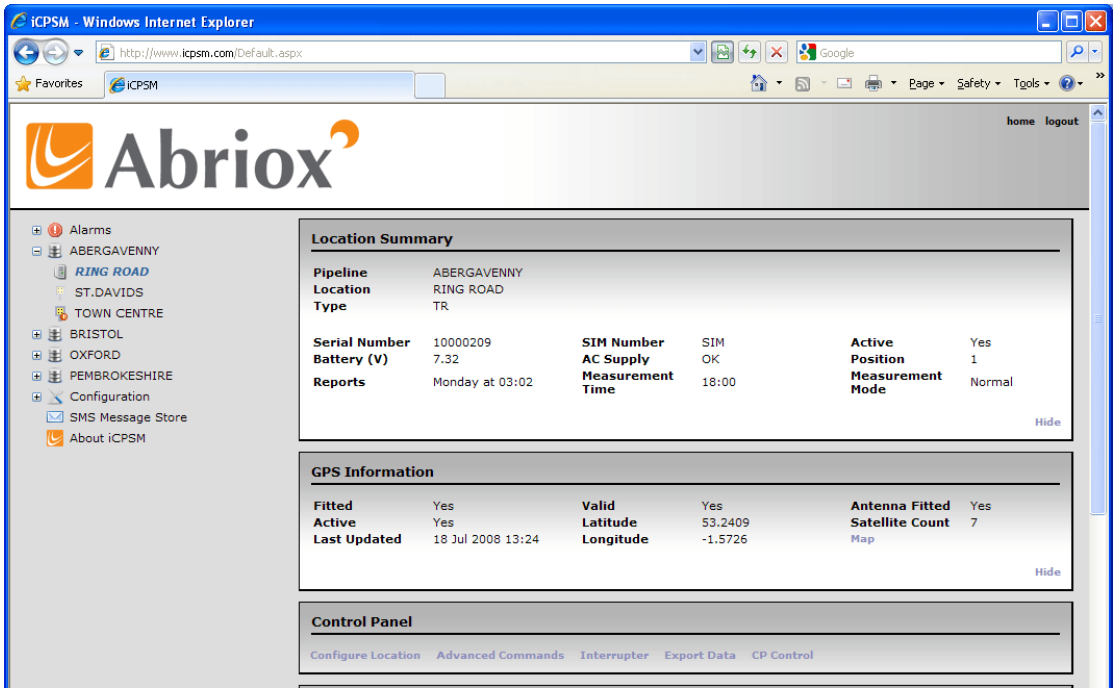
Tick the boxes next to the Locations you wish to stop interruption. To select all the Locations in one go, tick the very top box. Click the **Stop** button. A message will advise you confirming the request. Click the **Back** link to return to the main page.



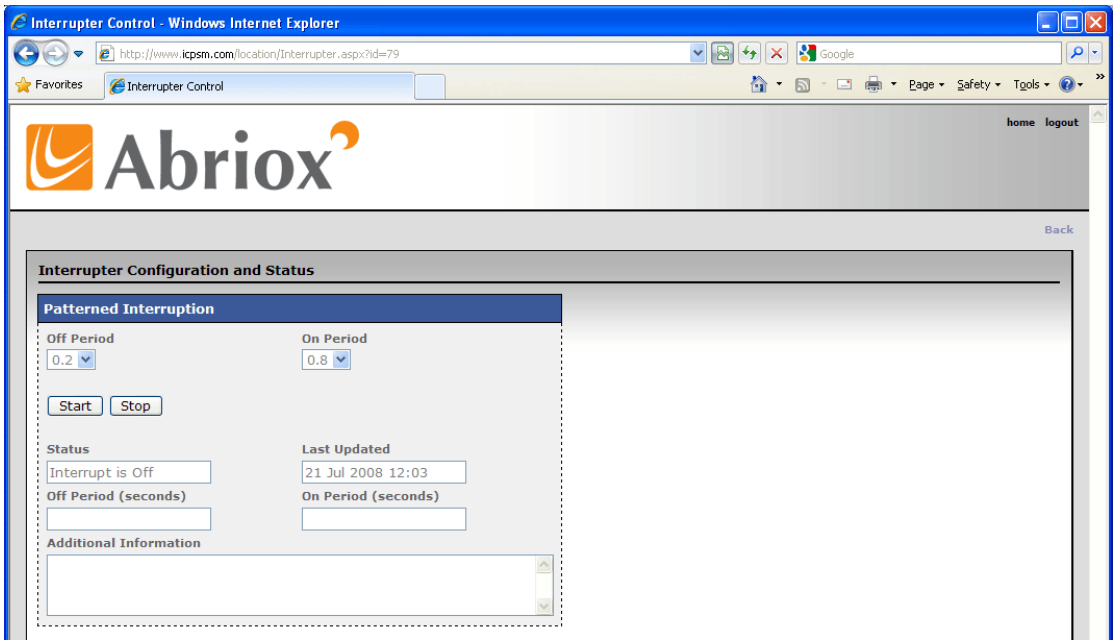
This will effectively turn CP back on for all Locations on that Pipeline. Once interruption has stopped, the icons will change back to the default active state:

Start a Patterned Interruption: Location

Interrupting at Location level will only affect that specific MERLIN TR Monitor. Select the **Location** on the left-hand side of the page, then click the **Interrupter** link under **Control Panel** located on the right half of the page.



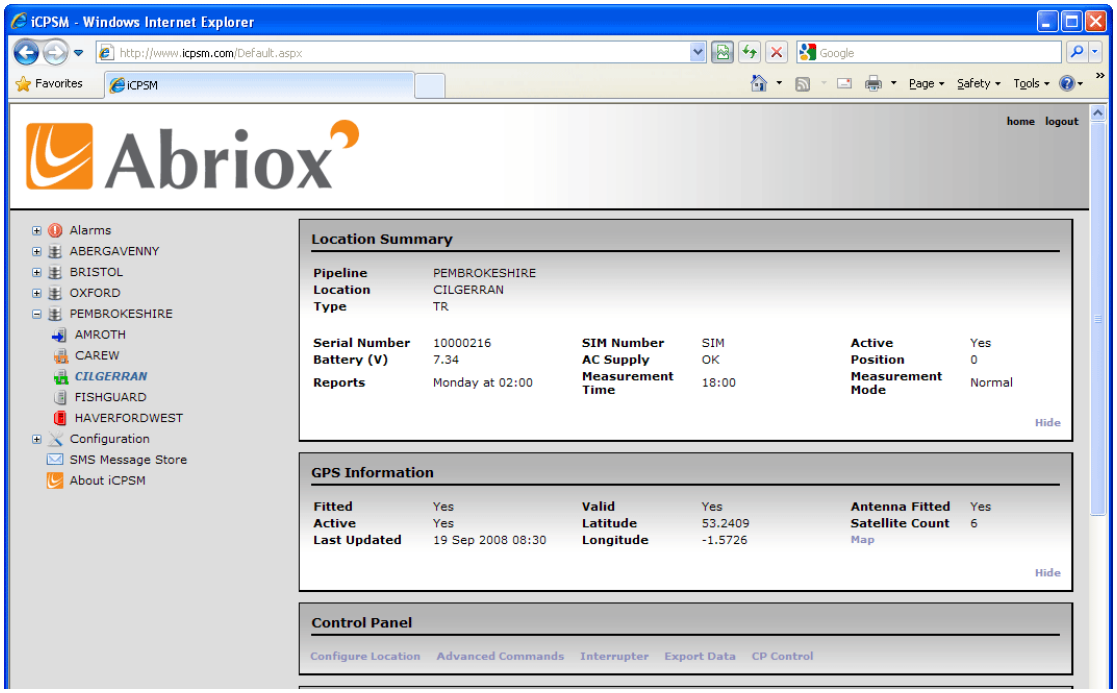
This will open a new page allowing you to enter the timing sequence for the patterned interruption. Using the drop-down menus, select the required timing pattern. The software will automatically provide suitable timing for the ON and OFF periods. Click the **Start** button to start interruption.



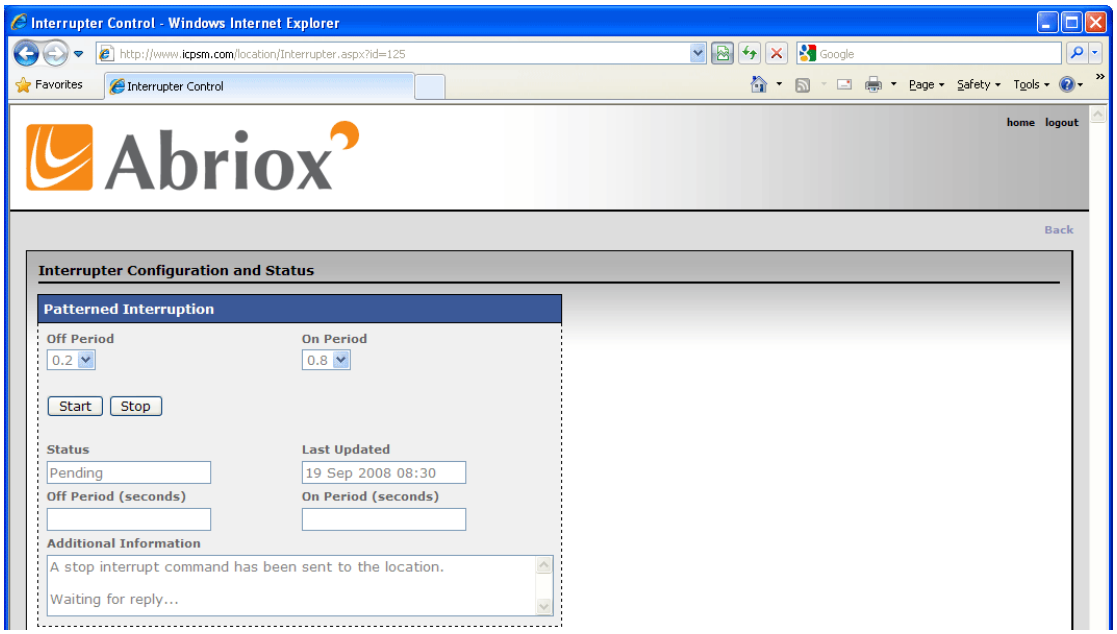
Click the **Back** link to return to the main page. As the unit receives the interrupt command, the icon will change to show interruption is taking place:

Stop a Patterned Interruption: Location

To stop an interruption at any time, select the **Location** on the left-hand side of the page, then click the **Interrupter** link under **Control Panel** located on the right half of the page.



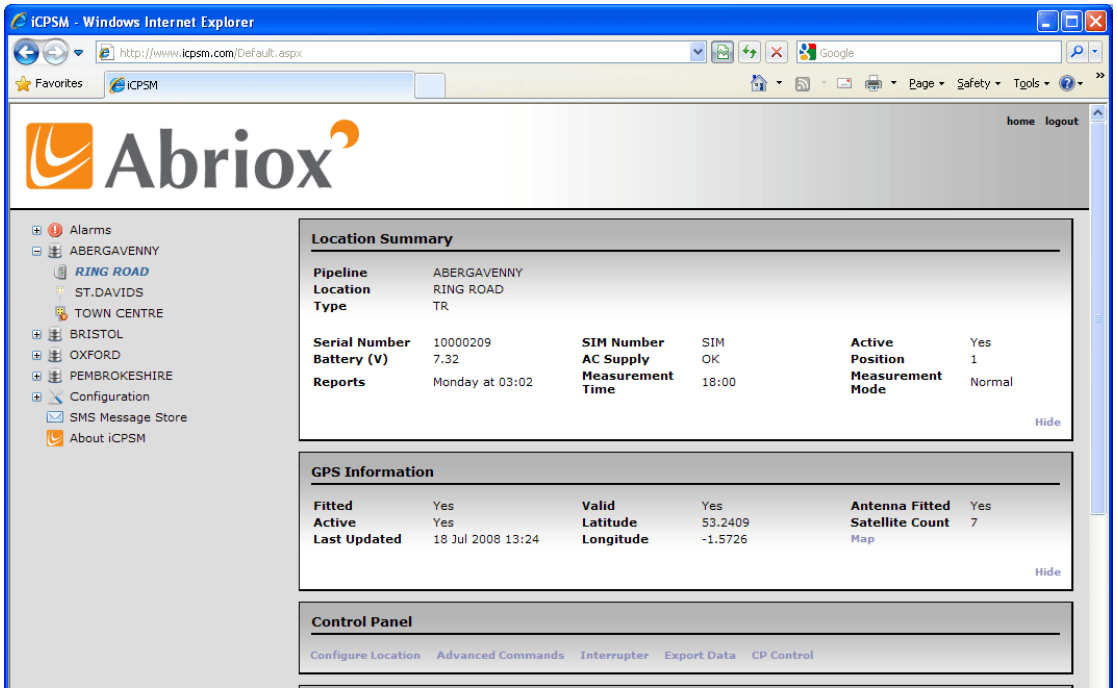
In the new page, click the **Stop** button. The Additional Information box will detail your request.



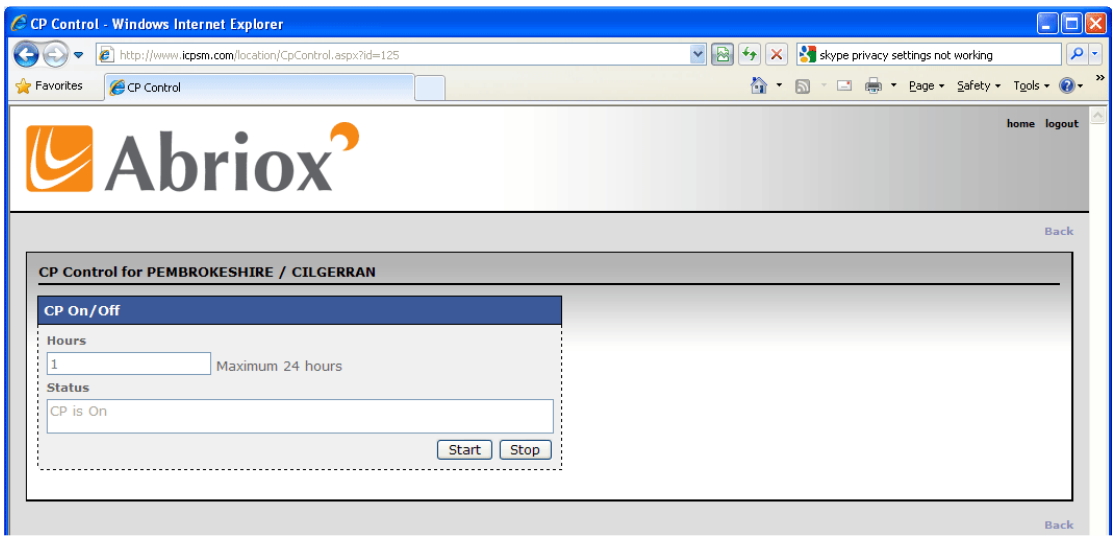
Click the **Back** link to return to the main page. Upon successful interruption stoppage, the icon will change back to its default state:

Start a Constant Interruption: Location

Interrupting at Location level will only affect that specific MERLIN TR Monitor. Select the **Location** on the left-hand side of the page, then click the **CP Control** link under **Control Panel** located on the right half of the page.



In the new page, enter the number of hours for the CP to be turned off and click the **Start** button. The system will automatically limit the maximum number of hours depending on the version of firmware installed.

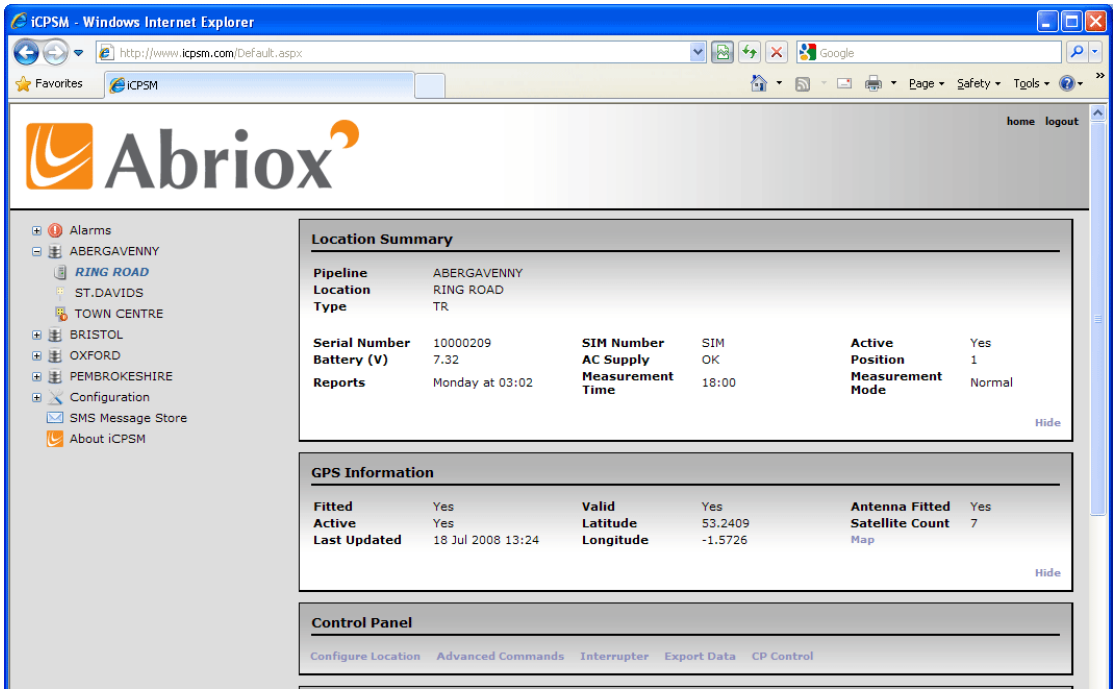


Click the **Back** link to return to the main page.

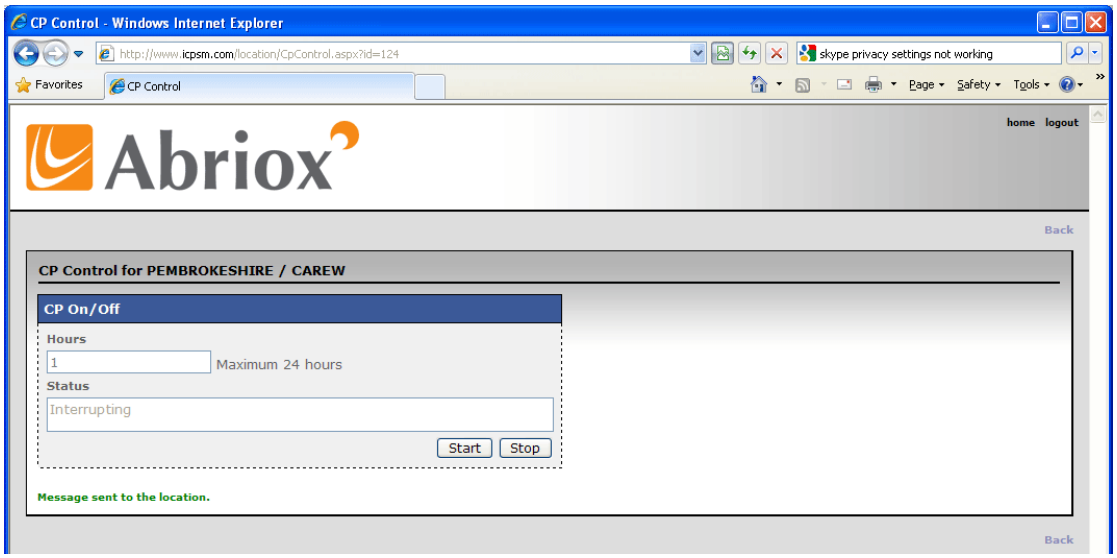
When Constant Interruption is active, the Location icon will change state:

Stop a Constant Interruption: Location

To stop an interruption at any time, select the **Location** on the left-hand side of the page, then click the **CP Control** link under **Control Panel** located on the right half of the page.



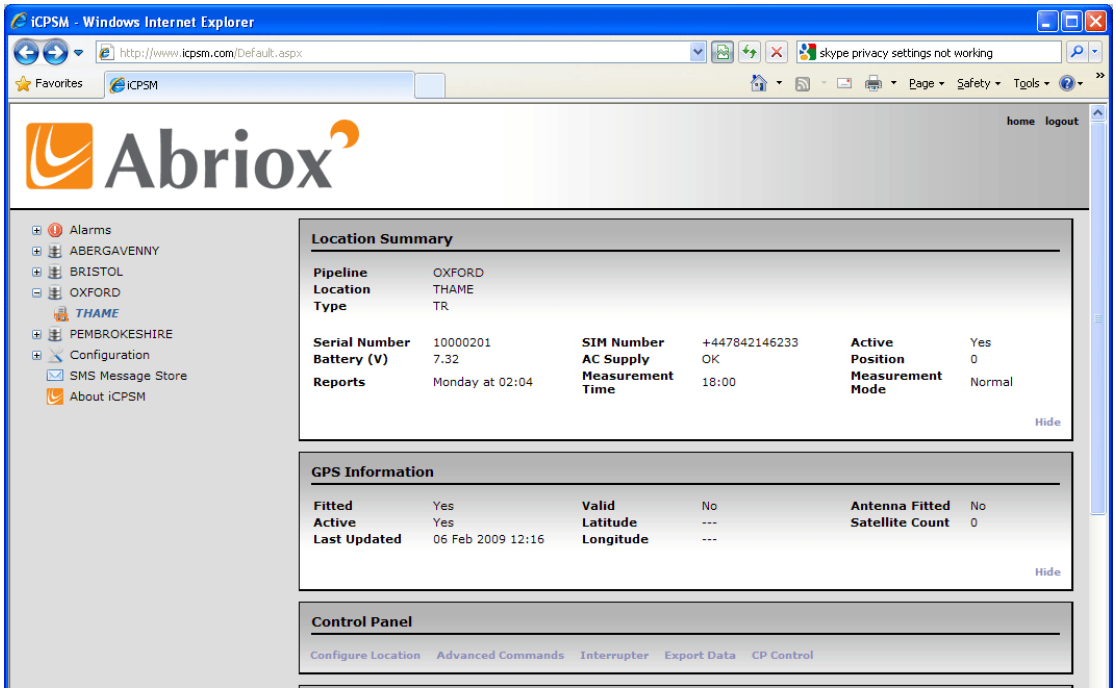
In the new page, click the **Stop** button. A message will advise you confirming the request.



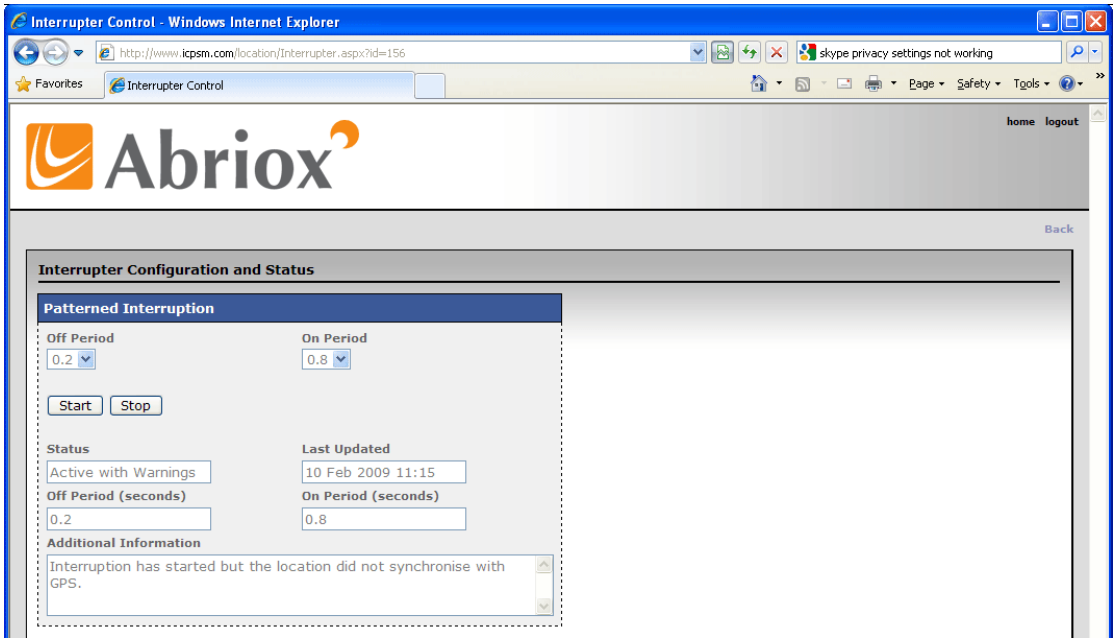
Click the **Back** link to return to the main page. Upon successful interruption stoppage, the icon will change back to its default state:

Check Interrupt Status: Location

To view the interrupt status at any time, select the **Location** on the left-hand side of the page, then click the **Interrupter** link under **Control Panel** located on the right half of the page.



This will open a new page displaying the current interruption status for that Location.

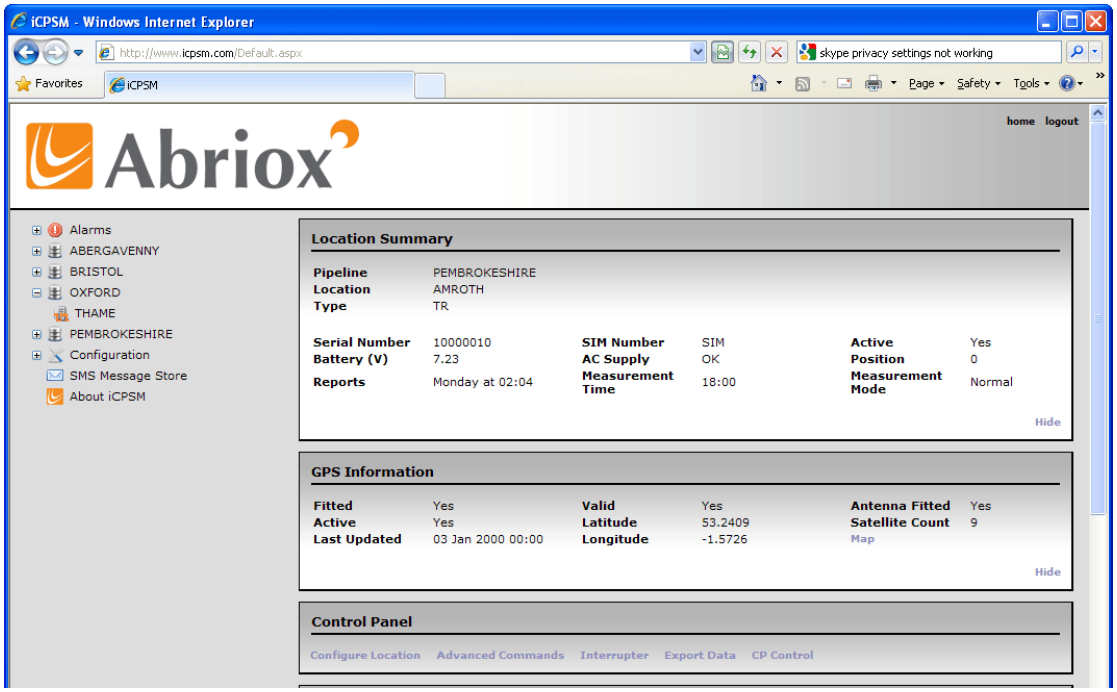


Alternatively, you can view the current Location status from the main page of the **iCPSM** software. The icons for the Locations represent their current status.

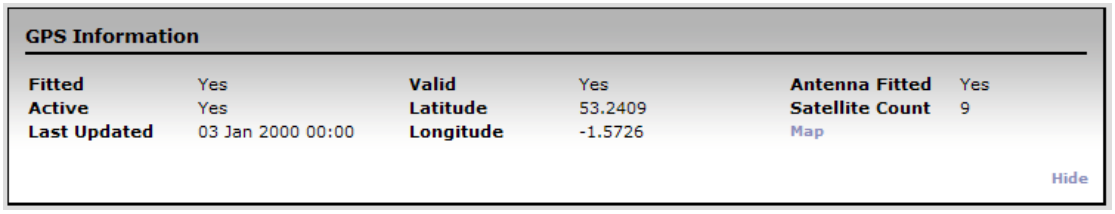
Click the **Back** link to return to the main page.

Checking the GPS Information of a Merlin TR

To view the GPS information of a specific Location, select the **Location** on the left-hand side of the page, on the right half of the page, under the **Location Summary** pane, you will see a **GPS Information** pane, click the **Show** link if you cannot see this information.



The GPS Information pane details the unit's position, the number of satellites it can see and the status of the GPS and GPS antenna.



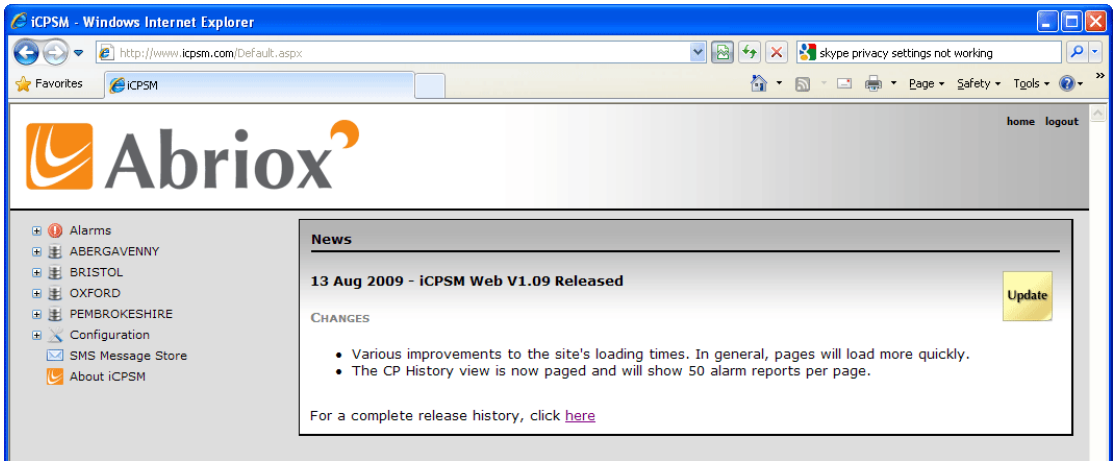
The GPS position is reported as latitude and longitude in degrees. The unit position can be viewed in Google Maps by clicking the Map link. This will open the default browser installed on the PC and display the coordinates in Google Maps.

This information can also be used in other third party mapping systems for ease or convenience.

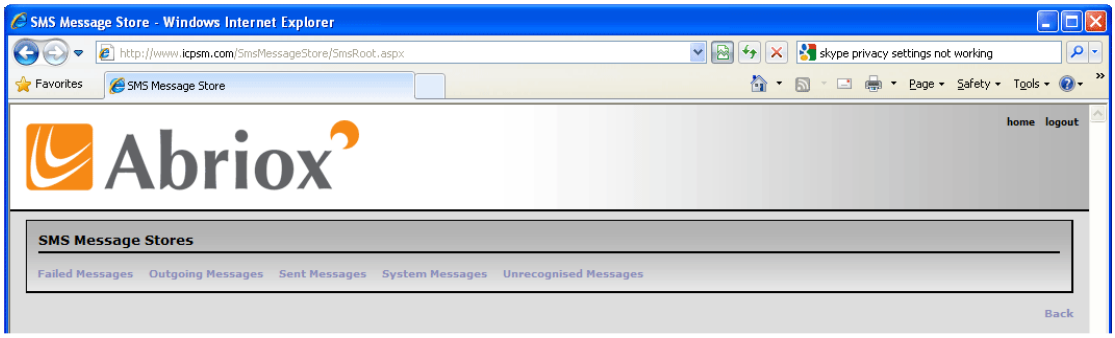
SMS Message Store

iCPSM is based on GSM communications. For all actions made in **iCPSM**, an SMS message is sent to the unit in the field, effectively telling it what the user wants it to do. The unit then replies back with an SMS message to confirm the action or request.

The SMS Message Store is an easy way to view the entire command history of your system. Select the **SMS Message Store** on the left-hand side of the main page.

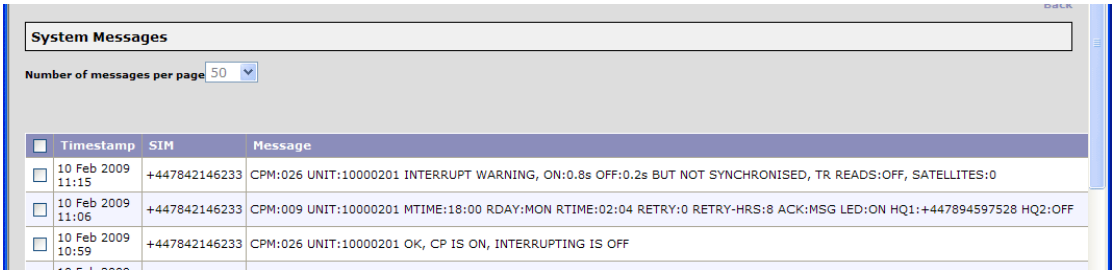


Selecting the relevant store folder displays the information on a new page.

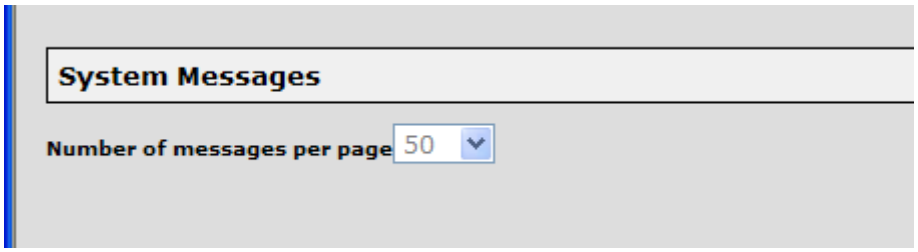


Typical information shown:-

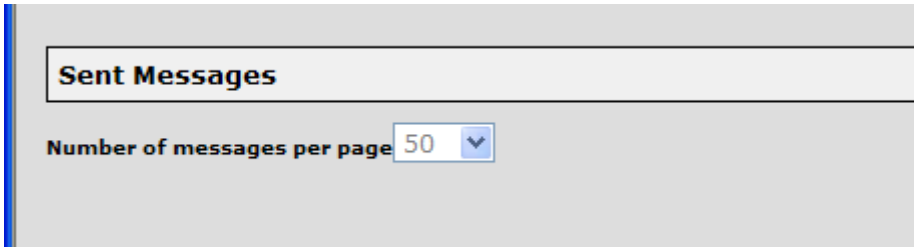
- Date and time the message was sent
- SIM number the message was sent to or from
- Message sent
- Number of retries left



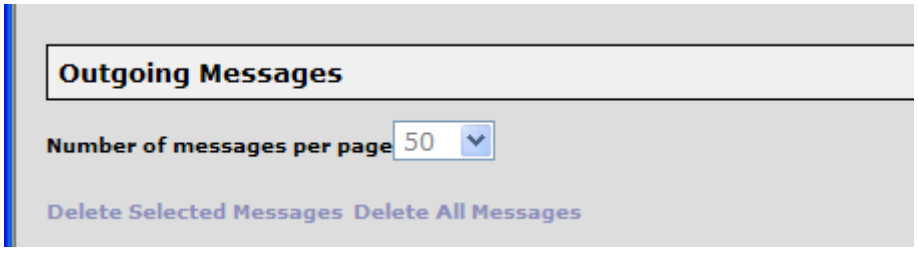
System Messages – displays messages received from the units. These can be used to verify an action has been carried out.



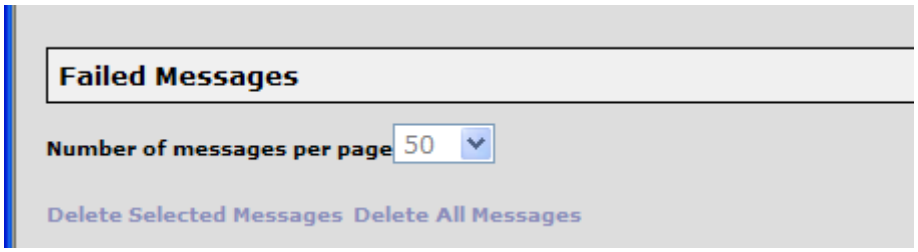
Sent Messages – displays the messages sent from **iCPSM** to the units.



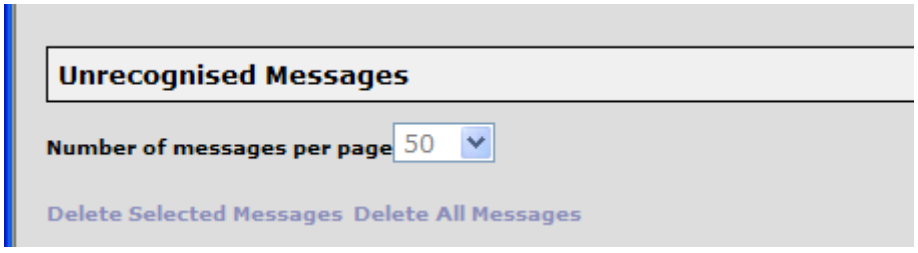
Outgoing Messages – displays any text messages waiting to be sent and the number of retries left.



Failed Messages – displays any failed messages sent to the units in the field.



Unrecognised Messages – displays any messages that were unrecognised by the system.



Troubleshooting iCPSM

Location reports Interruption Status is Active with Warnings:

One of the MERLIN TR Monitors does not have GPS Lock. Interruption will continue and full synchronisation will occur once GPS Lock has been achieved.

Location reports Interrupt Status is Pending:

*iCPSM has sent the message and is awaiting a response. Wait a few minutes; if nothing comes through check the status. Select the **Location**, click the **Advanced Commands** link under **Control Panel**. Click the **Get the Locations Interruption Status** link. This should "push" the message through.*

Location reports Interrupt Status as Failed:

*Select the **Location**, click the **Interrupter** link under **Control Panel** located on the right half of the page. Most errors of this kind are described in this pane, they are usually hardware-related, such as no power supply.*

Visual Aids:

The Location icons change depending on their status. This can be used as a visual aid to seeing the current interrupt status and help in diagnosing problems.

Icon	Description
	TR unit is active and in normal operation
	TR unit is inactive
	TR unit – CP is OFF
	Message sent – awaiting response from unit
	Interruption is under way but has warnings
	Interruption is active
	Interruption has failed